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The JOURNAL LANCET

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New Series
Vol. LXII, No. 1

January, 1942

Single Copies 25c
One Year $2

In This Issue

The Management of the Breech, W. A. Coventry, M.D. 1
The Vitamins, Edward H. Rynearson, M.D. 4
Tuberculosis Control Among College Students, Theoretical and Applied, Charles E. Lyght, M.D., F.A.C.P. 7
The American Indian's Contribution, Food and Drugs, H. A. Burns, M.D. 12
The Selective Service System and the Practice of Medicine, Robert A. Bier, M.D. 15
The Common Use of the Female Sex Hormones, Justin L. Conrad, M.D. 18
A Student Health Auxiliary, W. H. York, M.D. 20
EDITORIALS
- The National Physician's Committee 22
- Standardization of Proctologic Technique 23

Transactions of THE MINNEAPOLIS ACADEMY OF MEDICINE 24
BOOK REVIEWS 28
NEWS ITEMS 29
List of Physicians Licensed by THE MINNESOTA STATE BOARD OF MEDICAL EXAMINERS, November 13, 1941 30

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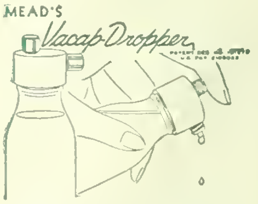

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Entered as second-class matter at the postoffice at Minneapolis under the act of March 3, 1879.
Published monthly by the Lancet Publishing Co.

The
JOURNAL
LANCET

Minneapolis, Minnesota
January, 1942

Vol. LXII, No. 1
New Series

The Management of the Breech*

W. A. Coventry, M.D.†
Duluth, Minnesota

PRIOR to 1930, it was my practice to allow the breech to deliver itself wtihout any external interference. This practice showed that the incidence of fetal mortality was higher than it apparently should be. After observing Dr. I. W. Potter of Buffalo demonstrate his method of doing versions and his method of extraction of the version, it occurred to me that the method of manual extraction was the best type one could employ for extraction of the breech, nature already having performed the version. It is along these lines that I have attempted to draw some very definite conclusions.

In statistics gathered in St. Louis and in Boston, the incidence of breech is about five per cent of all deliveries.

Previous to 1921, Boston statistics showed that the fetal mortality rate was approximately 12 per cent. Since 1921, they have used the traction method in delivery of the breech and their mortality rate has dropped to about five per cent. This incidence is about what one can look for in the hands of the average practitioner if he will follow the Potter traction technic of procedure. In other words, the change from the spontaneous delivery to the traction delivery has been well worth while. These statistics, however, are corrected statistics; that is, cases of marked prematurity, pre-eclampsia, eclampsia, chronic nephritis, syphilis, placenta previa and ablatia placenta should be ruled out when estimating the percentage. These exceptions also apply in ordinary cephalic presentation statistics.

The mortality rate in the breech should not be higher than it is in cephalic presentations. It has been shown that intracranial injury to the child does not occur any more frequently in a proper breech extraction than it does in other forms of presentation.

During the past 15 years, the resort to cesarean section in cases of breech presentation, working under the assumption that the mortality rate should be less, has run a wave of popularity which is very rapidly on the wane. There are, of course, certain very definite indications for performing a cesarean section in any obstetrical case; but it certainly is not the choice to be used in cases of breech presentation. If, however, there is a marked disproportion between the size of the fetus and the pelvis, cesarean section is in order. The same indications are true in a vertex presentation. If there has been a previous cesarean section or if previous delivery of a breech has resulted in the death of a fetus, this would be an indication for cesarean section. In other words, the indication should be the same in breech presentation as in cephalic presentation.

To determine whether a patient is going to present by the breech is sometimes quite difficult. Therefore, one may have to resort to an X-ray picture of the abdomen. The average anteroposterior X-ray picture will usually show a very large head, out of all proportion to

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*Read before the North Dakota State Medical Association annual meeting, Grand Forks, May 21, 1941.
†Duluth Clinic, Duluth, Minnesota.

the rest of the body. This, however, is frequently in error because the head is at a greater distance from the X-ray plate and one may get as much as 50 per cent distortion in the size of the head. It is far better to take a lateral picture to get a more accurate relationship of the size of the head to the rest of the fetus. Better still, is to take a stereoscopic X-ray film. The presence of an hydrocephalic head, of course, is very distressing in any type of delivery, probably more so in the type in which a breech presents itself. Hydrocephalus should be recognized by an X-ray picture, if properly taken. In the X-ray picture of the hydrocephalic head, one can observe small facial features, gaping sutures, larger fontanels and a marked disproportion between the body and the head. The normal head rarely shows a globular shape, but shows more a flattening of the occiput, while in hydrocephalus it is just the reverse.

An attempt to convert the breech into a cephalic presentation by external version and thus to lower the mortality rate is often disappointing. Siegel and McNally think they can lower the rate from 15 per cent to 3 per cent by doing external versions. There are several points in external version which they stress and which should be very closely watched. In attempting to do an external version, one should not use an anesthesia because this is apt to give a little more freedom in doing too forceful abdominal manipulation which can lead to several dangers to be mentioned later. It is also very important that the fetal heart-beat be watched very carefully in doing the external version because if it gets markedly slow or irregular or increases in rapidity, one should immediately stop the maneuver. The transformation of a breech into a cephalic presentation is really a two-man maneuver. It must be done very slowly and very methodically because too forceful manipulation will not only cause marked contractions of the uterus defeating the entire purpose, but there is also a danger in too forceful manipulation of causing a premature rupture of the membranes or premature labor. Other dangers are a premature separation of the placenta, a twisting of the cord about the neck, rupture of the uterus and it is possible to cause intrauterine death. My own experience in attempting to do an external version has not been very successful. It is a well known fact that many external versions immediately revert back to breech or footling presentations.

In the delivery of a breech there are three procedures which may be followed. One is to let the breech deliver in the normal way, taking the usual length of time or taking a much longer time to deliver with a greater mortality rate to the fetus; the second method is allowing the breech to be born to the umbilicus and then delivering by traction; in the third group, are those who break up the breech and deliver by traction. It is my impression that the third method is the best. In breaking up the breech and delivering by traction, I know of no method that equals the method taught by the Potters of Buffalo.

There are a few cardinal principles which must be very definitely borne in mind in a traction delivery:

1. No attempt should be made to deliver until there is complete dilatation of the cervix or a cervix which is completely dilatable. The last phase—completely dilatable—is stressed because the conical shape of the fetus, as it is delivered by breech, causes a gradual dilatation of the cervix and by the time the shoulders have delivered it is fully capable of taking care of the delivery of the head.

2. The second essential in delivering by this method is complete anesthesia. This does not mean a partial anesthesia; it means a complete surgical anesthesia. Potter uses chloroform. This method is not advisable except when the anesthetist is trained in the use of chloroform. The ordinary ether method or ether and gas will allow complete anesthesia.

3. The third step comes in ironing out the perineum, with a gloved hand, and preferably with a long glove, elbow length (if you have not an elbow length glove you may use the ordinary rubber glove provided you have a sterile gown over which the cuff of the glove may properly fit.) With very generous use of tincture of green soap, first introduce the finger into the vagina and then two fingers and then three fingers and then finally the entire hand and gradually and thoroughly knead out the muscles of the perineum.

4. After this has been done and the entrance is easy and accessible to the vagina, one may proceed and get a foot or both feet and bring them down. Often when the feet are fully extended upward and the full buttock presents itself, one may have to flex the knee so as to bring down the first foot. Also, if it is difficult to bring down the second foot, one does not necessarily have to do so. Traction may be used on one foot, but it is certainly neater and better if one can bring both feet down. This maneuver is slightly technical, but it usually meets with no particular difficulty. In holding the feet, it is well to hold them about the ankle with one hand, using very slow downward gentle traction. The Walcher position is recommended. The buttocks, in practically all cases, will turn posteriorly, and will be delivered by slow gentle traction posteriorly. At this point if one is using for traction only one leg, then he may bring down the other leg very easily. Thereafter, one would use both feet for traction. In traction, it is my opinion that it is never advisable to place the hands upon the thighs of the fetus, but always continue with steady downward traction with the hand or fingers about the ankles of the fetus. This will then not lead to the danger of a fractured hip. If the traction is slow and steady there is no danger of any other dislocation. This traction is well borne by the hip joints.

As the buttocks are delivered posteriorly, traction is continuous, the body naturally or gradually turning so that the back is anterior. Steady traction is then maintained until the umbilicus is reached. When the umbilicus is reached, the umbilicus being posterior and the back anterior, the cord may be pulled down slightly to make sure it is not being impinged upon. Traction is further continued slowly and steadily, but not too strongly. One will then find that one shoulder will deliver anteriorly. As the shoulder presents anteriorly traction by the feet ceases. At this point a new maneuver enters, the delivery of the shoulder and arms. One thing which Potter stresses and which I have found by practice to be very valuable, is the fact that the shoulders and arms are delivered by pressure on the angle of the scapula of the anterior shoulder directing the pressure upward toward the spine of the fetus. The arm then will very readily slide out posteriorly, after the anterior arm and shoulder have been delivered. With both hands, the trunk is rotated so that the other shoulder appears anteriorly and the second arm is delivered in the same maneuver by pressure upon the posterior part of the scapula, raising the scapula up and the arm sliding out posteriorly. This same maneuver works very satisfactorily if the arm should be extended over the head. As soon as both arms and shoulders are delivered, one must bear in mind this is one place where he must not get excited, because the delivery of the head can take time. At this point, the index finger of one hand is introduced into the baby's mouth, pressure is then exerted from above downward on the head and the head is delivered in the line of the natural curve of the pelvis, the finger in the baby's mouth acting as a guide only. If, however, any undue resistance is met, Piper's forceps may be placed on the after-coming head and the head delivered very easily. Episiotomy seldom appears necessary. It may be done if indicated.

There are several DON'TS which must be stressed and which one must definitely remember, I will repeat:

1. Do not attempt to deliver unless there is complete anesthesia.

2. Take your time, there is no hurry.

3. Get the traction entirely by having your fingers around the ankles. This will not lead one to use too much force and will not cause any broken bones.

4. Never press on the fundus until after the arms are delivered. Pressure on the fundus before the delivery of the arms is very apt to, and almost invariably will cause the hands to be extended over the head.

5. Never attempt to deliver the arms or shoulder by pressure over the shoulder or clavicle.

6. Never use traction on the baby's neck.

In either of the latter two cases one may get a disagreeable Erb's paralysis.

These are some of the DOS:

1. Take your time in delivering the fetus. Fifteen minutes is not too long a period of time.

2. Deliver the buttocks posteriorly.

3. Deliver each shoulder anteriorly.

4. When delivering the arms, use pressure under the scapula, easing the scapula out, and the arms will deliver themselves very readily. After the arms are delivered, do not be afraid to guide the head slowly through the pelvis by pressure from above, and, if necessary, apply forceps. If one has not ironed out the perineum properly, episiotomy at this stage may be in order. It is not indicated before this stage.

Let me repeat the most important DON'T of all: Never use traction by putting the hands over the baby's shoulders. It may result in a nerve paralysis, or, more likely, one is apt to overstretch the neck.

This method of delivery of the breech has added a great deal to reducing the mortality rate of the fetus and has not caused any increased mortality or increased complications for the mother; for these very reasons alone, it is well worth following. The carrying out of these very few dicta will certainly reward one for following the method of Potter in the delivery of the breech.

BIBLIOGRAPHY

1. Danforth, W. C., and Galloway, C. E.: A Study of 285 Cases of Breech Delivery, Am. J. Obst. & Gynec. 35:123, (Jan.) 1938.

2. Dippel, A. L., and King, A. B.: Errors in Diagnosis of Hydrocephalus in the Breech Presentation, Am. J. Obst. & Gynec. 38:1047, (Dec.) 1939.

3. Hansen, E. M.: Breech Delivery, Am. J. Obst. & Gynec. 41:575, (April) 1941.

4. Hawker, W. D., and Soule, S. D.: Breech Delivery, Surg., Gynec. & Obst. 71:819, (Dec.) 1940.

5. Goethals, T. R.: Management of Breech Delivery in Primiparas, Am. J. Obst. & Gynec. 37:663, (April) 1939.

6. Ibid: Management of Breech Delivery in Multiparas, Am. J. Obst. & Gynec. 38:105, (July) 1939.

7. Rosenfeld, S. S.: The Management of the Breech Position, Am. J. Surg. 69:420, (Sept.) 1940.

8. Siegel, I. A., and McNally, H. B.: Breech Presentations and Prophylactic External Cephalic Version, Am. J. Obst. & Gynec. 37:86, (Jan.) 1939.

The Vitamins*

Edward H. Rynearson, M.D.†

Rochester, Minnesota

SO much has been written on the subject of vitamins that it is difficult even to suggest where a practical discussion in condensed form of these substances may be found. The papers which were presented in the symposium in the *Journal of the American Medical Association*[1] are available and valuable. Other books and innumerable articles have been written, but no effort will be made in this brief paper to review all of them or to refer to them specifically. Rather, an effort will be made to present in as condensed form as possible a general discussion in regard to some of the more practical aspects of the problem of vitamins. I am indebted to my associates, Drs. Snell and Butt, for much of the material presented in this paper.

It should be emphasized at the outset that vitamins are only one of the substances which are essential to life, yet in consideration of the dietary needs of the nation, most of the time is spent only in a discussion of the vitamins and little is said about the importance of proteins, amino acids, fatty acids, minerals, electrolytes and hemopoietic substances. Our grandparents never heard of vitamins and yet for the most part they enjoyed good health and in this part of the United States probably rarely demonstrated evidence of vitamin deficiency. The reason is not hard to find, for in those days families were eating wheat as it was reaped and other food products in their natural form. A considerable portion of the vitamin deficiency today can be attributed solely to the demands on the part of the American public for "purified" products. We Americans have permitted ourselves and our children to be educated in the eating of special cereals and special foods and in so doing have denied them many of the important ingredients which our grandparents enjoyed.

Another consideration which should be mentioned is the tremendous amount of unfortunate advertising. Having for most of this century made an effort to prepare foods so as to deplete them of their content of vitamins, we are now overcompensating by placing undue emphasis on the subject of deficiency of vitamins and are urging unnecessary ways of administering preparations of vitamins. The ludicrous state to which this has descended is best illustrated by the advertisement of lipstick and other cosmetics which contain necessary vitamins! A visitor from Mars, given access only to the newspapers, magazines and radio, would gain the impression that this is a nation of persons who generally are suffering from depletion of vitamins but a fortunate nation in that vitamins can be obtained in so many easy and pleasant ways.

Another contributing factor to this confusing state is the overemphasis placed on vitamins by pharmaceutical houses. The medical profession is urged to prescribe "shotgun" preparations of vitamins for everybody and for every condition. The result is that at least $100,000,000 is being expended in drug stores this year for vitamin products.

VITAMIN A

Actual cases of deficiency of vitamin A are encountered rarely. In one effort to induce deficiency of vitamin A, two physicians went on a diet totally deficient in this substance, one for three months the other for six months, and in neither instance was there any clinical evidence of deficiency. Night blindness does result from deficiency of vitamin A, but it should be mentioned that the tests for dark adaptation used in the diagnosis of this condition are often unreliable. Keratomalacia, xerophthalmia and other changes in the eyes, skin and epithelial structures occur even less frequently, but if any of these conditions are present they respond readily and dramatically to administration of from 50,000 to 100,000 units of vitamin A daily. It should be mentioned that patients who have diseases of the liver or conditions in which there is absence of adequate bile in the intestinal tract, such as diarrhea as a result of sprue, celiac disease and other conditions, require larger amounts of vitamin A.

VITAMIN B COMPLEX

Vitamin B complex is an excellent term, for, to distort its meaning, the vitamin B complex is complex. It is not known how many fractions there are; a dozen or so have been described, only half of which have been identified chemically. Rarely can a condition be defined as caused by the lack of a single fraction; rarely does a state of deficiency respond to administration of a single fraction. On the contrary, patients are encountered deficient in the entire complex who are relieved by receiving only the entire complex. Higgins, who used rats, proved the essentiality of using the whole complex in rats deficient in vitamin B, rather than using single or multiple purified fractions. Consideration of some of the components of the vitamin B complex follows.

Thiamine. Thiamine is referred to loosely as the "antineuritic vitamin." Meiklejohn stated, "One striking feature of both studies is the absence of any clear evidence of polyneuritis resulting from deficiency of thiamin. This is in agreement with the conclusions reached from a recent study of the literature. As this study shows, the belief that thiamin lack results in polyneuritis is founded on a misconception. The only certain consequence of this deficiency is a disturbance of carbohydrate metabolism, resulting in the accumulation of lactic and pyruvic acids in the tissues. This disturbance in animals causes certain neurologic signs, and in man, muscular pain and weakness. The relief of these changes by the administration of thiamin has given rise to the erroneous belief that thiamin will cure nutritional polyneuritis, which frequently coexists but is due to another, probably multiple, deficiency. In view of this and of the foregoing evidence it appears that thiamin should no longer be referred to as the antineuritic vitamin. It is of interest that recent experiments on pigs have produced extensive degenerative changes in both the central and peripheral nervous systems by feeding a diet adequate in thiamin, riboflavin and nicotinic acid but lacking some unknown factor or factors present in yeast and liver.

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*Read at the meeting of the North Dakota State Medical Association, Grand Forks, May 20, 1941.

†Division of medicine, Mayo Clinic.

"Another interesting feature of the foregoing experimental studies is the clear demonstration of the disturbance of carbohydrate metabolism that results from thiamin deficiency, as evidenced by changes in the blood levels of sugar and lactic and pyruvic acids, detectable under suitable conditions. This change in metabolism is presumably responsible for at least the greater part of the clinical findings in these subjects; and as might be expected, they are not easily distinguished from those resulting from any other influence affecting adversely the normal, healthy, biochemical processes of the body. The clinical picture is that of general ill health, both physical and mental. From a practical point of view it is clearly difficult to distinguish thiamin deficiency, except perhaps in its extreme forms, on clinical grounds alone."

This discussion prompts two comments. First, it is supported by many failures to relieve the symptoms of neuritis by the administration of thiamine hydrochloride. I have administered large amounts of this substance, both by mouth and intravenously, to many patients who had diabetic neuritis and have rarely seen any benefit. Other failures in attempting to treat other types of neuritis are being published. Second, Meiklejohn's emphasis on the important role of thiamine in the metabolism of carbohydrate suggests the importance of its use for those patients who are receiving intravenous injections of glucose for prolonged periods.

Williams, Mason, Wilder and Smith conducted a study to determine what does happen when the diet is markedly deficient in its content of thiamine. The diet of four women was made deficient in thiamine for 88 days; these women complained of fatigue, lassitude, backache, insomnia, muscular weakness and tenderness, extreme anorexia, nausea, vomiting, constipation, loss of weight, palpitation, dizziness, dyspnea and precordial distress. It does not follow, however, that all patients who have these symptoms are suffering from a deficiency of thiamine. As a matter of fact, this substance is generally and generously distributed in foods, and normal persons who have a good general diet need not fear this deficiency. Unfortunately, the diet of the average American is deficient in thiamine. The addition of thiamine to some foods is important; the tragedy is that it is removed from the foods in the first place.

Thiamine is of value in the treatment of the mental and neural changes found in the "end stages" of the patient suffering from chronic alcoholism. In this condition also, it is best administered in combination with other factors of the vitamin B complex.

Nicotinic acid. Nicotinic acid was first described by Elvehjem for the treatment of blacktongue of dogs, which is considered the analogue of human pellagra. Its use in the treatment of pellagra has been widely reported but doubts are expressed in regard to its specificity. In the treatment of this condition, nicotinic acid is administered in a dosage of 300 to 500 mg. daily, given in divided doses. In order to avoid the unpleasant side reaction of flushing of the skin, nicotinic acid amide can be administered. It should be added that the whole syndrome of pellagra cannot be cured permanently by the use of nicotinic acid alone; it is necessary to use the whole vitamin B complex.

Jolliffe and his associates[5,6] reported dramatic improvement in treatment of the end stages of chronic alcoholism; by the administration of large doses of nicotinic acid he reduced the mortality rate from 80 to 13.6 per cent.

Snell and Butt[7] reported that in certain cases hepatic coma responded rather dramatically to the intravenous administration of nicotinic acid. They also recommended the daily, intravenous administration of nicotinic acid to patients who have received prolonged intravenous injections of glucose, since glucose occasionally causes coma in cases of severe hepatic disease. Nicotinic acid amide is preferable to nicotinic acid for intravenous use.

Nicotinic acid also has been utilized in the treatment of sulfanilamide intoxication, trench mouth and the glossitis occasionally associated with myxedema.

Riboflavin and other components. Signs of deficiency of riboflavin are found frequently among patients who are also suffering from deficiencies of thiamine and nicotinic acid. Common clinical findings resulting from a deficiency of riboflavin are vascularization of the cornea, cheilosis, magenta-colored tongue, seborrheic lesions of the ears, nose and forehead and fissuring of the commissures of the lips.

The average requirement of riboflavin for a normal adult is about 2 mg. daily; much larger amounts (up to 15 mg. daily) may be necessary therapeutically. No satisfactory preparation is available for intravenous administration.

Other separate components of the vitamin B complex include pyridoxine, pantothenic acid, choline and biotin. Their usefulness is not yet well defined.

Vitamin C

Ascorbic acid is of recognized clinical value in the treatment of scurvy, but thanks to modern transportation of food, scurvy is rarely encountered in this country. Just how difficult it is to produce scurvy is illustrated by the report of Crandon, Lund and Dill. A healthy young adult received a diet deficient in ascorbic acid for six months; although the level of ascorbic acid in the blood plasma fell to zero early in the course of the experiment, thirteen weeks elapsed before any signs of scurvy developed. At no time was there any bleeding of the gums. One wound made after he had been on the diet deficient in ascorbic acid for three months healed promptly. The second wound, made at the end of six months, failed to heal until ascorbic acid was administered. The important observation is not only that ascorbic acid aided in healing of the wound but that such prolonged deficiency was necessary to interfere with healing.

In addition to its use in scurvy, ascorbic acid is of value in the treatment of hemorrhagic states in which there are low levels of ascorbic acid in the blood and urine, during pregnancy and lactation, in cases of gastrointestinal and hepatic disease (especially diarrheal diseases), in chronic infectious states (especially arthritis) and after surgical procedures.

VITAMIN D

Little comment will be made in regard to vitamin D, the best known and most widely used of all vitamins. Even this vitamin is exploited and it is impossible to find a "shotgun" vitamin product which does not contain generous amounts; it is included, together with vitamin A, because it is inexpensive. Evidence is accumulating to suggest that the indiscriminate prescription of large amounts of this vitamin may, in conditions such as arteriosclerosis, be most undesirable.

Its use is important in the treatment of rickets, and in other conditions in which the absorption and utilization of calcium is essential, such as the deficiency of calcium of parathyroid insufficiency. In the treatment of rickets, from 10,000 to 1,000,000 U.S.P. units are prescribed daily for children, including premature infants.

VITAMIN E

Vitamin E, or alphatocopherol, is one of the most recently recognized vitamins. Because, in animals, deficiency of vitamin E produces degeneration of the spinal cord, associated muscular atrophy and decreased sexual function, this vitamin is advocated for the treatment of sterility, amyotrophic lateral sclerosis, muscular dystrophy and similar conditions. This is false reasoning and is not supported by facts. However, the appeal of a "sex stimulating vitamin" is tremendous and millions of dollars will be spent by a misguided public. Actually, it will be some time before the clinical use, if any, of this vitamin will be known.

VITAMIN K

Vitamin K was studied thoroughly by capable investigators and its therapeutic uses were carefully defined before it was placed on the market. Although one of the newest vitamins, it is one of the most important and probably will save more lives, if properly used, than many of the others. It is thoroughly described in a recent monograph by Butt and Snell.[9] Briefly, it is of value in the treatment of the hemorrhagic diseases caused by a deficiency of prothrombin, such as hemorrhagic disease of the newborn and hemorrhagic disease associated with certain diseases of the gastrointestinal and biliary tracts. Active, nontoxic preparations of vitamin K are now available for oral, intramuscular or intravenous administration. In most instances, the daily dosage is from 2 to 4 mg. If it is administered to pregnant women in the last week of gestation it results in a normal level of prothrombin for the infant at birth, or if given to the infant at birth it will prevent the consequent development of deficiency of prothrombin. Similarly, it will promptly reduce the bleeding time of surgical patients whose blood is deficient in prothrombin; failures may occur in cases of severe hepatic damage.

COMMENT AND CONCLUSIONS

Although certain unfortunate groups in this country are suffering from deficiency of vitamins it does not follow that the whole nation is deficient.

Who, then, needs supplements of vitamins? First, the poor. Is it not, however, more logical to plan adequate diets for these people rather than to give preparations of vitamins? One way or another, this group must be assured an adequate supply of vitamins.

Then there is the person who, for one reason or another, is on an ill-advised diet. The diet may have been suggested by a food faddist or, more unfortunately, by a physician who is too enthusiastic about dietary treatment for one condition or another, often an "allergy". Another group of patients who often suffer from vitamin deficiency are those who have serious gastrointestinal disease. Any gastrointestinal disease which interrupts the continuity of the gastrointestinal tract or which interferes with the absorption of vitamins may produce marked vitamin deficiency. Pellagra and polyneuritis commonly are present in cases of gastric carcinoma and deficiency of vitamin of one type or another is present in cases of gastrojejunal colic, fistula, diarrheal states, severe hepatic disease and so forth. Another group of persons who need additional vitamins are those who have an unusual demand for these substances; this occurs during pregnancy and lactation, prolonged febrile illnesses, the postoperative state, prolonged administration of glucose and so forth. Finally, as has been mentioned, the patient who has chronic alcoholism may suffer severely from deficiency of vitamins and responds promptly to their administration.

In the prescription of vitamins it is far better to determine which vitamin is necessary and to administer it only for a brief period. If improvement does not result, its use should be discontinued. An effort should be made to avoid the use of shotgun preparations, as they may contain an excess of vitamins A and D.

If the normal person could or would eat food which contains the essential vitamins in adequate amounts, there would be no necessity for fortification of foods or taking of "vitamin pills". Unfortunately and realistically, there is little possibility that this will be the solution for our national problem. The poor can't get the proper food and the rich won't eat it.

Many foods now marketed are so deficient in certain vitamins that as long as they are sold to the public they should be fortified.

It was not my intention in this brief article to question the existence of states of vitamin deficiency in any way. I feel that the use of the proper vitamin in the treatment of a patient who requires it is an honest therapeutic measure. An effort has been made, however, to state that the expenditure of more than $100,000,000 in drug stores for vitamin products is a tribute to the gullibility of the American public rather than an index of deficiency of vitamins.

References

1. The vitamins; a symposium on the present status of the knowledge of vitamins, Chicago, American Medical Association, 1932, 192 pp.

2. Higgins, G. M.: Unpublished data.

3. Meiklejohn, A. P.: The vitamins, New England J. Med. 224:420-424, (March 6), 1941.

4. Williams, R. D., Mason, H. L., Wilder, R. M., and Smith, B. F.: Observations on induced thiamine (vitamin B_1) deficiency in man, Arch. Int. Med. 66:785-799, (Oct.) 1940.

5. Jolliffe, Norman: Effects of vitamin deficiency on mental and emotional processes, A. Research Nerv. & Ment. Dis., Proc. (1938), 19:114-153, 1939.

6. Jolliffe, Norman, Bowman, K. M., Rosenblum, L. A., and Fein, H. D.: Nicotinic acid deficiency encephalopathy, J. A. M. A. 114:307-312 (Jan. 27) 1940.

7. Snell, A. M., and Butt, H. R.: Hepatic coma: observations bearing on its nature and treatment, Tr. A. Am. Physicians. (In press.)

8. Crandon, J. H., Lund, C. C., and Dill, D. B.: Experimental human scurvy, New England J. Med. 223:353-369, (Sept. 5) 1940.

9. Butt, H. R., and Snell, A. M.: Vitamin K, Philadelphia, W. B. Saunders Co., 1941, 172 pp.

Tuberculosis Control Among College Students[*]

Theoretical and Applied

Charles E. Lyght, M.D., F.A.C.P.[†]

Northfield, Minnesota

THIS outline of the tuberculosis case-finding being carried on in American colleges and universities shall be followed with a sketch of how a tuberculosis program is operating in a mid-western liberal arts college. I shall also venture a few suggestions and predictions looking toward the future of student health work as it relates to the problem of tuberculosis both among students and in the general population.

More ridiculous than "carrying coals to Newcastle" would be any attempt on my part to debate with you who practice daily among the tuberculous, the advisability of supporting case-finding efforts in schools, be they public or private, elementary or higher institutions of learning. Nor need I pause to argue the merits of various procedures and technics that go to make up a control program.

However, it may not be amiss to catalog the procedures our Committee has recommended as being close to the theoretical ideal, although we stand prepared to scrap outworn methods and to advocate new departures as soon as innovations have passed the experimental stage and proved themselves reliable and practical. The problem in most colleges is not merely to find cases of tuberculosis, nor even to find them early, but rather to finance the undertaking once the interest and approval of the administration have been gained, and the coöoperation of students and parents secured. Accordingly, the Committee tries to preserve a realistic viewpoint, and favors any method that will guarantee the best possible use of whatever money is available, yet so as to provide maximum coverage for the health protection of the largest possible number of students. This has resulted in our adoption of a simple, elastic set of suggestions, capable of being stretched or shrunk to fit the needs of colleges, no two institutions being constituted exactly alike or in identical circumstances.

In its publications and by correspondence the Committee advocates:

1. *A program based on tuberculin testing,* as, only in that way can all or almost all infected individuals be identified as such. We stress the necessity of including all students on a campus, so that the very individuals most needing the scrutiny may not prove to be the ones who, by chance or design, manage to elude the test and escape its benefits.

2. We deprecate any system of tuberculin testing that neglects to follow up the finding of a positive reaction with *at least a single flat X-ray film of the lungs.*

3. *Positive reactors should receive as much more detailed study as their roentgenograms, history and physical findings suggest.* Needless to say, suspicious cases should be subjected to infirmary study as deemed necessary, sputum and/or fasting gastric sediment examinations, guinea pig inoculations, erythrocyte sedimentation determinations, total leucocyte and differential counts, follow-up of weight, temperature and pulse, fluoroscopic observation, and repeated films and physical examination of the lungs. Non-pulmonary tuberculous lesions, uncommon nowadays it is true, may be encountered, and will demand appropriate methods of evaluation.

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[*] Presented before the Lymanhurst Medical Center Staff Meeting.

[†] Chairman, Tuberculosis Committee, American Student Health Association; Director, College Health Service, Carleton College, Northfield, Minnesota.

4. *Positive reactors with presumably healed but significant amounts of tuberculosis require more than ordinary clinical follow-up.* They need protection against undue activity in athletics, curricular or extra-curricular work, and chance of reinfection from without.

5. *At least annual re-testing of negative reactors and re-filming of positive reactors is urged.* In such "special hazard" courses as medicine, nursing, veterinary science and dentistry it seems wise to render the intervals shorter, re-testing every three to six months, re-filming similarly, as well as seeking means of reducing opportunities for infection to the minimum.

6. *Any reliable brand of tuberculin is acceptable,* though for some years we have recommended use of the Purified Protein Derivative for the sake of uniformity of results, and because of a slightly enhanced specificity claimed for that product. However, colleges unable to fit P.P.D. into either their routine of testing or their budgets have been advised to adhere to the use of well-standardized Old Tuberculin, such as Saranac Lake O.T.

Up to date we have refrained from approving routine use of the Vollmer patch test in view of certain obvious and supportable artefactial possibilities when it is employed. In response to our suggestion that interested schools try out the patch technic against carefully controlled coincident Mantoux or Pirquet tests, it has appeared that the results of the patch test are approximately at the level of a standard first-strength dose of P.P.D. or 0.1 mg. of O.T. Accordingly, we still advocate the Mantoux intracutaneous method, feeling that a measured quantity of known-potency tuberculin introduced beyond peradventure of doubt between the skin layers is preferable to any conceivably less certain technic thus far developed. Apart from the elimination of a needle-prick for the apprehensive or objecting patient, we are not at all convinced that the patch test as at present administered represents actual saving in time, visits or expense when a large group of active young adults must be handled, especially by a small staff, quite divorced from any argument concerning the number of positive reactions it may discover.

8. *In spite of the admitted bother, perhaps even resentment, caused by a two-dose testing procedure, we recommend it, with a dosage proceeding to* 0.005 *mg. P.P.D., or* 1.0 *mg. O.T.* First, we believe the very allergic individual is protected against unduly severe reactions by the dilute first dose, while the second-strength test continues to locate a considerable number of persons who are truly positive reactors, yet who would be dismissed as negative if testing ended with the primary dilution. Time and further study will serve to provide an answer for the natural question: "How many active cases of tuberculosis are to be expected in the second group?" Certainly, our annual returns include a significant number not ascertained except through use of the stronger second test.

9. As regards X-ray procedures, *we like to regard a single flat film as the irreducible minimum.* Preferably celluloid films should be used, but where circumstances dictate the use of paper film, the latter, in proper hands, has proved admirable, as shown by several studies. Stereoscopic, lateral or oblique films are to be used whenever the flat film suggests their need. The use of a good fluoroscope equipped with a fast-type screen and operated by a competent and experienced physician is exceedingly helpful as an adjunct to the static, single-plane studies represented by flat films. We feel that rarely should fluoroscopy be relied upon as the sole roentgen method. Accuracy of diagnosis of the very early lesion, as well as the preservation of a permanent record makes filming the optimum procedure. The presently popular investigation and discussion of small photographs of fluoroscopic lung images suggest that a new weapon may be at hand, promising absurdly cheap films once the proper equipment has been installed. Until it has been shown authoritatively, however, that the vast majority of minimal lesions can be found by this maneuver, we shall not advise its adoption by college health services, where minimal cases are the ones we hope most to find.

10. The Tuberculosis Committee has pointed out ever since its formation in 1931 that it is not sufficient to maintain a case-finding program directed at and for students alone. We see no logic in omitting from the screening process the food-handlers, administrators, teachers and other college personnel who mix with, minister to, and can very easily furnish infection for the students. Therefore, we have proclaimed *the need for including every human being on the campus when a search for tuberculosis is under way.*

11. *The hand-in-hand coöperation of family doctor, college physician, public health officer and social worker* has been indicated as a necessary precursor to, part of and follow-up for a college tuberculosis control program. Since "tuberculosis comes from tuberculosis," we have stressed to the colleges that infected students must have trails that lead back to infectious contacts, that many of these contacts may be run to earth if the proper agencies are notified and set to work, and that many an otherwise overlooked open case may be found and further contamination of innocent people prevented.

Results of the Tuberculosis Committee's Work

The program sponsored by the Tuberculosis Committee of the American Student Health Association was carried to the attention of the colleges through the kindness and with the financial aid of the National Tuberculosis Association. I shall not tire you with a lengthy recital of statistics as the Report has appeared in the pages of the Journal-Lancet for April, 1940. However, a few representative figures may serve to give point to the general account of progress I shall relate.

For the academic year of 1938-39, we sent out questionnaires to 857 colleges and universities, receiving replies from 282, or 18.5 per cent more than the preceding year. Of these schools, 165 were able to report a tuberculosis program in progress, where the number had been 133 the year before and only 104 a year earlier. This amounts to a 57 per cent increase in programs over a two-year period. In addition, 21 other schools told of new programs beginning but not yet reportable, while several in negro colleges are not here included.

The institutions replying were of all types and sizes, ranging from small colleges with well under 500 students apiece, up to very large universities with as high as 16,000 enrolled. The distribution was representatively nationwide, though the great preponderance was in the mid-West, New England, Eastern and Far Western schools, with a relatively poorer response in the deep South, Southwest and Southern Atlantic areas.

Of the 165 colleges with programs tabulated in 1938-39, 143 used the tuberculin test, while 22 X-rayed without prior testing. Breaking down the 143 tuberculin testing replies, we discover 136 using Mantoux technic, 3 the Pirquet test and 4 the Vollmer patch test. When we enquire as to the product used, we find P.P.D. being employed in 79 schools; 55 used O.T., 4 the patch material, and 5 failed to specify.

Wherever an adequate dosage of tuberculin was given, it did not seem to matter materially whether P.P.D. or O.T. was chosen. Returns from 48 colleges using up to the standard second-strength dose of P.P.D., and testing over 33,000 students, gave 30.5 per cent positive reactors. On the other hand, 34 schools that ran their dosage, affecting over 21,000 students, up to 1.0 mg. O.T., were able to report a positivity of 30.1 per cent. Perhaps this comparison is not strictly fair, as a controlled study would call for coincident testing of each of the 54,000 individuals with both products, but it should be recalled that the colleges were numerous —82 in all; they were well scattered geographically; and a considerable number of students was included in the contrasted groups.

More striking is the comparison of results in colleges using what we have set forth as our understanding of adequate dosage with figures supplied by colleges where a smaller than recommended amount was used. During the past two years 82 colleges have followed the advocated procedure, have tested as high as 55,000 students annually, and have reported to us a positivity of 29 to 30 per cent. Something over 30 other schools using the smaller dosage procedure on up to 20,000 individuals, have been able to report only 15 per cent positive reactors. The 4 colleges this year employing the patch test used it on about 4,000 students, finding 17 per cent positive, very slightly in excess of the results in the second group of schools above.

Each year finds more colleges in the ranks of those providing annual re-testing of previous negative reactors. Last year there were 59 in that progressive class.

Encouraging is the fact that no less than 71 institutions are now requiring tuberculin testing and chest films for their food-handlers. Only 30 were in that desirable category two years ago. Also, where we found only 29 schools offering or requiring faculty coverage in 1936-37, last year the total had grown to 49 institutions displaying sufficient alertness to the problem to have adopted such a sensible attitude.

Further progress of gratifying nature is disclosed by returns revealing annual X-raying of positive reactors in 52 colleges—21 more than the preceding year. Others describe plans calling for X-raying "as often as deemed necessary after viewing the first film," of X-raying "freshmen and seniors," et cetera, while the number with but a single X-ray or less, fortunately is steadily dwindling.

Only 5 colleges last year relied on the fluoroscope only, but in a swelling number—36, to be exact—the screen is used as a supplementary aid to films.

Positivity to tuberculin in the student-age group seems now to lie nationally in the zone of approximately 30 per cent, granted adequate dosage is employed. In 1932-33, even using an uncorrected figure necessarily diluted by the inclusion of inadequately tested individuals, the national student average of positive reactions was 35 per cent. Hence, it is obvious that a steady decline in the infection rate really is in progress. Men seem to run 1 to 2 per cent higher positives than do women at a given age within college years, though young women still lead men in cases of clinically active tuberculosis and in tuberculosis deaths during that period of life.

Advancing age, as is well recognized, witnesses expanding incidence of infection. College returns corroborate this by showing 17 year old students to average about 20.5 per cent positive reactors. This rises in a smoothe curve to 35 per cent in the 25 year old bracket, and achieves the surprising rate of 66 per cent positive in the smaller group of graduate students, upon whom we have statistics, past the age of 35 years.

That tuberculosis case-finding pays rich dividends could not much better be demonstrated than by our national figures for last year. In the 165 schools reporting some form of program operating, there were enrolled approximately 350,000 students. Search for the disease discovered 241 clinically active, 368 apparently arrested cases, while 320 old, previously diagnosed cases were back in college under observation. In all, that makes 929 cases of tuberculosis in the records of these schools, and, of these, 151 were advised to leave college and did so. Contrast this, if you will, with 117 colleges answering our questionnaire, but having no actual tuberculosis program, even though many did possess some form of student health service. Among their approximately 130,000 students, 4 clinically active, 15 apparently arrested, and 10 formerly diagnosed tuberculous individuals were found, or a total of 29 cases recorded for the year. The reason most such cases were diagnosed at all was that they finally developed symptoms sufficient to bring them to the doctor. Four cases left college because of tuberculosis. Look for tuberculosis—we find 929 cases among 350,000 young people. Wait for it, and we find 29 cases out of a population of 130,000 sitting sickly on our doorstep. The rest of the cases are still out among their friends, waiting for us to wake up and come seeking them. Further laboring the facts seems unnecessary indeed, except to wonder what is going on in the colleges from which we do not so much as receive a reply.

TUBERCULOSIS CONTROL PROGRAM AT CARLETON COLLEGE

Let us observe how such a program as the Committee advises works in a typical, moderate-sized American college. At Carleton College, one of two institutions located in Northfield, Minnesota, a town of 4,500 population, there is an annual enrollment of about 850 students, divided into approximately 400 women and 450 men. These students are drawn mostly from the mid-West, though there are individuals from all parts of the country each year, with a few from foreign countries.

A statement of health on a college form is received from the family physician of each matriculant some weeks before college opens. We now find, contrary to the experience of a few years ago, when virtually no students had received or even heard of the tuberculin test prior to encountering it in college, that 52 per cent of our new students have been tuberculin tested at least once before reaching us. Nearly all the positive reactors are armed with reports of chest X-rays or bring the films along.

Early in the fall, usually by mid-October, we select a week and reserve the period immediately after the evening meal on Monday, Wednesday and Friday for tuberculin testing, giving it wide publicity, setting up our testing stations in the common rooms of the men's and women's dormitories. We employ additional medical aides, nursing and clerical helpers. The students understand that this is an integral part of the required annual physical examination of every student. Starting at 6:30 P. M., having excused in advance all the known positive reactors, we are able to dismiss the last student and food-handler by 8 P. M., so that the body of the evening remains undisturbed. We employ P.P.D., the two-dose method, and use platinum-iridium needles, flamed between tests.

X-rays on positive reactors are handled by the technician in large daily batches, while the doctors use the fluoroscope liberally on selected cases. Time does not permit of its being made a routine procedure.

Suspicious cases receive all the study it is necessary and feasible to provide, as outlined earlier in this paper, together with consultation with a specialist on chest diseases whenever advisable, and adequate observation and follow-up as long as they are allowed to remain in college.

We discover about 25 per cent positive reactors in the whole student body, student ages running from 17 to 25, with the great bulk between 18 and 22 years. The men display about 2 per cent higher positivity than the women.

When we break down the figures for the past two years, our data being incomplete prior to that, we are able to substantiate the findings of various other investigators, even though our group is too small for us to risk unduly exacting deductions or attempt sweeping generalizations. For instance, we find that out of 1,190 students examined, the lowest incidence of infection is in the group from our own State of Minnesota, being 22.1 per cent, a gratifying commentary upon the tuberculosis control and public health effort at large in this commonwealth. The remainder of our mid-Western students must automatically include a large percentage coming from Chicago and suburbs. With such an urban origin, it is not surprising to find 26.7 per cent positive. From the balance of the United States we derive a much smaller number of students, but these people run 29.3 per cent positive. Finally, the foreign-born group, 26 in all, lives up to expectations by showing a positivity frequency of 61.5 per cent.

Examining into the residence-origin of the students, and classifying as "suburban" those rural areas or places with a population below 2,500 and not immediately adjacent to large cities, we see that in our negative reactor group 53 per cent are from suburban homes and 47 per cent from large centers. In the positive reactors, as might be guessed, the ratio is reversed, there being 56 per cent from the metropolitan centers of population, while only 44 per cent are from country districts or small towns.

Again, recalling that the greater the element of exposure to centers of relatively high tuberculosis infection rates the greater the odds in favor of infection, we find in our negative reactors that 87 per cent have both parents born in this country, 13 per cent have one or both parents born outside the United States. Among our positive reactors, on the other hand, 80 per cent have both parents of American birth, while 20 per cent record foreign parentage on one or both sides of the family.

It is admittedly impossible to accept a history of "no tuberculosis contact" when the tuberculin test proves positive. It simply means that contact did occur, though the patient remained blissfully unaware of it. However, a certain number of students can and do recall instances of acknowledged contact with cases of the disease. In our limited series, only 76 individuals testified that they definitely had been exposed, after we had discarded several reports where close inquiry showed exposure to have been extremely brief or entirely questionable. It is significant, however, that only 3.5 per cent of the negative reactors were in the group reporting known contact with tuberculosis, as against 15 per cent of the positive reactors.

Our roentgenological results reveal a fairly constant ratio annually, and seem to compare reasonably with those of others who work among students. We determine that about 65 per cent of the chests X-rayed ,(and that includes every one of our positive reactors), are interpreted as showing no macroscopic evidence of tuberculous infection. Of the remainder, we find 12 to 13 per cent with recognizable parenchymal healed primary complexes, 9 per cent with pleural changes in the form of caps, haze or adhesions, and 23 per cent with calcified hilum deposits. Some of these cases present more than one of the findings mentioned. On account of that overlapping, the total may seem to add up to more than 100 per cent. During the past four school years since the establishment of a modern student health service at Carleton, we have discovered 5 cases of active tuberculosis, one each year, with two in one year. Four of these students have left college and sought prompt and appropriate care. Excellent results in every case were obtained, and, with the exception of one patient now under treatment in a sanatorium, all the individuals have secured arrest or retrogression of their lesions. All are in graduate schools, married or employed.

One of our cases is an almost classic example of how easy it is to find minimal, symptomless tuberculosis by modern methods, and, at the same time, how readily it can be overlooked by less than thorough search. This student's family physician gave her an unqualified health recommendation. She was free of symptoms and looked the proverbial "picture of health." Her family history was devoid of allusions to tuberculosis, and she knew of no contact with a case outside the home. Her entrance physical examination, which we like to think of as a very thorough one, revealed no signs of pulmonary pathology, nor did subsequent re-examinations even after we had seen the shadow of her lesion on X-ray films. She was negative to the first dose of tuberculin, 2-plus positive to the second. She had no fever when examined in the office, but was found to run a slight febrile response late each afternoon when hospitalized and subjected to five-minute temperature determinations. Her sedimentation rate was very slightly more rapid than normal, her leucocyte count 12,000, with a shift to the left in the differential distribution. Her roentgenogram showed a small area of soft infiltration near the periphery in the left infraclavicular zone. The girl was unable to provide us with any sputum. Early morning gastric lavage gave a sediment negative for acid-fast bacilli on direct smear of a centrifuged specimen by two different laboratories. Yet a guinea pig inoculated with some of the same material died in six weeks, autopsy showing typical tubercles. Under the microscope these were found to be filled with masses of live tubercle bacilli. There are many points in the investigation of this girl at which it would have been easy, some might say excusable, to cease looking for tuberculosis. Fortunately for the patient, her family and her schoolmates, this mistake was not made.

As regards our food-handlers, we have found several cases of old tuberculosis. After prolonged clinical observation, these have all been listed as healed, non-infectious cases. Up to date, the program has not been made obligatory upon the faculty and administrative employees. Offering them the service optionally resulted in a very incomplete response. Again, in this group, the signs of previous infection were relatively much more frequent than in the students, although no active cases were turned up. We feel that the failure to include everyone on our campus in the painstaking search for tuberculosis we aim to prosecute leaves the whole system weak at one important point and open to serious criticism. However, like our colleagues elsewhere, we believe more in education than in arbitrary rules, and we hope that a solution will be found soon.

Future Outlook

Finally, what of the future outlook? In a recent paper I posed the question of what would be the reaction if a student carried poliomyelitis or smallpox to his college campus. The immediate alarm, the isolation of the patient, the frantic but determined search for the source of his infection, and the elaborate precautions invoked to watch and protect other students were suggested. I need not repeat them here. My point was to contrast that attitude—admirable as it may be—with the apathy in high places when an insidiously developing disease of far more crippling and deadly proportions, such as tuberculosis, comes under discussion. Frankly, despite years of campaigning by a variety of influential agencies, it seems difficult to convince a certain type of executive mind that a real problem exists, and that a safe, reliable, cheap, life-saving procedure is available by which early diagnosis, early treatment, and, usually, early cure can be promised. Were I to quote, as I could, from the dozens of replies received annually from educators within the unconvinced and thus far uninterested group, you would find it hard to believe that they could have put into letters concepts of tuberculosis for which any high school student would be "flunked" on a hygiene quiz.

However, this is the state of things, and the sooner we hunt out the unenlightened corners of our academic household and see to it that proper illumination is provided, the earlier we shall have these well-intentioned but misinformed presidents, deans, yes, even college physicians working with us and not at cross purposes.

Over against this challenging debit side, is the heartening credit of increased interest generally, the growing number of colleges with tuberculosis programs, and the awakening of general practitioners, internists and tuberculosis specialists to the value of the assault being made on tuberculosis by student health services. As we become mutually aware of what the others are doing, we shall each automatically catch the vision of how best to combine, to coöperate, so as to render our own efforts and those of our associates more effective. If there is anything more satisfying than a job well done, it is the stimulating knowledge of a job that has been well begun but that calls for vigorous carrying forward. I have nothing but hope for the future of college tuberculosis control.

The American Indian's Contribution

Food and Drugs

H. A. Burns, M.D.
Ah-Gwah-Ching, Minnesota

DIET, to the simple single animal cell, is a matter of coming in contact with some other form of life. Its diet is neither identified nor is it classified; it is utilized by the organism only because it is an absorbable and digestible substance. With higher forms of life, where cell specialization has taken place, a much greater variety in the diet is required and made possible through both recognition and classification.

The relationship of diet to social, intellectual and political development of a people has been given much consideration in the past. Concerning the Chinese, Wu writes, "The Chinese are small in stature compared with Americans and English. They live shorter lives with higher mortality among both adults and infants. They are peaceful, non-persevering, non-progressive, non-enterprising and are easily contented with the environment in which they find themselves. Are these qualities inherited from the ancient Chinese who came to Eastern Asia thousands of years ago, or are they the result of malnutrition continued from generation to generation. There is considerable evidence that the latter is the case."

Over large areas of the old world, mankind has learned to live in the cold and barren north or the hot and dry temperate or tropical climates. He is able to live only through the pasturage of his animals which have made him care for herds of cattle, horses and flocks of sheep. With them he travels where there is promise of grass. He may be Mongolian or Arab, his country Lapland, Siberia or Africa. He is a herder of animals whether they be reindeer under the Arctic circle or camels on the fringe of the Sahara. These people cannot afford to live upon the flesh of the animals they own. They must sell their surplus since this is their only income. Vegetation can only become a small and unimportant part of their diet since they have no permanent home. Their diet, therefore, is largely limited to milk, whey and cheese. The Kir'hez nomads of central Asia have no other food than milk and foods that can be made from it. Of all people, their diet is probably the most restricted, yet they get sufficient of the essential foods, limited as they may be, to maintain a long lived and a hardy race.

Food to primitive man is considered with a certain quality of reverence; he makes sacrifices at both the time of harvest and at the feast.

The Salishan Indians, particularly the young people, offer this prayer to the balsam root before they eat for the first time each year of new fruit or berries or roots: "I inform thee that I intend to eat thee. Mayest thou always help me to ascend, so that I may always be able to reach the tops of mountains, and may I never be clumsy . . . I ask this from thee, balsam root. Thou art the greatest of all in mystery."

Food of the American Indian was usually consumed as found. Some groups had advanced to a point where they had developed permanent village settlements with gardens and sheep and goats. Others lived as a result of hunting and were the forest Indians. Still others, living in the great plains area, lived almost entirely from the migrating buffalo herds and had become almost entirely dependent upon flesh for food. In the region of the lakes and sea coast, they secured fish as one of the main sources of food. The Indian showed considerable proficiency in taking advantage of the natural stores of food in the region in which he lived. In spite of the great distances from cultural Indian centers in the southwestern United States, Mexico, and Peru, most of the northern Indians cultivated gardens; they knew about tobacco and where it grew, or had substitutes for it. They also grew in the most remote regions sunflowers, pumpkin, squash, gourds and maize.

Because he had little or limited food stored, the Indian was dependent upon his prowess as a hunter or luck in finding an abundance of roots. Seldom was the Indian well nourished; he was constantly searching for food. Because he depended upon what he found normally in his environment, his numbers could never increase beyond what the average harvest of uncultivated plants might feed. Moving about as he did, through pressure from without or food shortages within the tribal organization, usually meant encroachment on his neighbors resulting in war, or starvation; thus, for many generations tribal groups were only able to maintain themselves on a submarginal nutritional basis which more than any other single factor retarded the Indian in progressing beyond his primitive culture.

In his search for food the Indian made many discoveries which he added to his culture. Often he found articles that did not react as food and were used medicinally, as purges, diuretics and narcotics. However, to meet his demands for food many things were tried. Table I gives the uncultivated sources of food stuffs usually found among our northern Indians and usually consumed as found. Sap from six kinds of trees provided the only source of sugar except what was obtained from wild berries and honey.

TABLE I.
FOOD SOURCES

Tubers	17	Seeds	53
Buds	12	Seed Pods	4
Stems	13	Cambium Layer of Shrubs	4
Roots	38		
Bulbs	6	Lichen	5
Tea	13	Beans	8
Nuts	23	Leaves	23
Fruit	36	Berries	47

There was little or no commerce in food stuffs. Hunger was too universal to permit the accumulation of surpluses for barter. The community ownership of such property was based on the nutritional needs of the group.

Among the Chippewa, Smith found 74 different plants used as food and 198 as medicines. Six plants were used as substitutes for tobacco, 10 were used to make beverages and 27 were used for hunting charms. The American Indian has made a real contribution to modern life through his knowledge of drugs and his use of certain food plants. In many ways the cultural centers of Europe were in no way superior to the isolated Indian groups so far as knowledge of food and medicinal values were concerned. Biglow says, "The Royal Society of London gravely inquired of Sir Philberto Vernatti whether the Indians can so prepare the stupefying herb Datura that they make it lie several days, months, or years, according as they will have it, in a man's body, and at the end kill him without missing half an hour's time."

The foods and medicines which were added to European culture by the American Indian have in no small degree aided in social progress since made. It is impossible to separate at this time food and medicinal plants since they were both found in the search for food. This search has resulted in the discovery of plants with supposedly occult powers, some of which have become accepted as medicinal, others with narcotic properties without further medicinal use.

The origin of food plants that have come into the daily diet and have taken an honorable place at the world's dining table are distributed as follows:

Southern Europe	38
Temperate Asia	5
Europe	24
India	49
China	21
Africa	11
Asia	19
Mediterranean countries	31
North America	12
Central America	8
South America	26

While this hemisphere has not been inhabited for a long time by an agricultural people, over 17 per cent of the valuable food and medicinal plants come from America, including:

Irish potato	South America (Chile & Peru)
Jerusalem artichoke	North America
Sweet potato	West Indies
Arrowroot	Tropical America
Coca	Peru, Bolivia
Quinine	Bolivia, Peru
Tobacco	North America
Custard apple	Tropical America
Cashew nut	Tropical America
Pumpkin and squash	North America
Prickly pear	Mexico and United States
Persimmons	North America
Tomato	Mexico and South America
Avocado pear	Mexico, West Indies
Paw paw	North and Central America
Pineapple	Mexico and Central America
High bush cranberry	North America
Blueberry	North America
Coconut palm	Florida
Blackberry	North America
Cranberry	North America
Sunflower	North and South America
Maize	North and South America
Peanut	South America

De Candalle in his *Origin of Cultivated Plants* says, "A noteworthy fact is the absence in some countries of indigenous cultivated plants. For instance, we have none from the arctic or the antarctic regions, where it is true the floras consist of but few species. The United States, in spite of their vast territory which will soon support hundreds of millions of inhabitants, only yields as nutritious plants worth cultivating the Jerusalem artichoke and the gourd." Since this statement was written some fifty years ago the American plum has become the parent of 200 varieties; from the wild American grape even more varieties have been developed, while the modern raspberry and strawberry are the result of developing and domesticating of our own native berries.

In Guatemala, the Indians had developed several varieties of corn, each adapted to a particular climate dependent upon the altitude. There were other varieties further adapted to climatic conditions in both North and South America. Corn was widely distributed throughout the early Americas. It, more than any other plant, made it necessary for the harvester to be a gardener.

"Four hundred and forty-nine years ago, on November 5, 1492, two Spaniards whom Christopher Columbus had delegated to explore the interior of Cuba returned with a report of 'a sort of grain they call maize which was well tested, baked, dried and made into flour.' And so was introduced to the white man a plant which has since become, from the standpoint of total production, the second most important food plant in the world, a cereal treasure of immensely greater value than the spices which Columbus travelled so far to seek in his search for a westward route to India."

"Since the introduction of maize into white man's agriculture, many improvements have been necessary in general farming methods. The acceptance of maize as an important farm crop carries with it the acknowledgment to the Indian of our dependence upon them for our modern practice of agriculture."

The following developments are attributable to corn:

1. Varieties were developed for use in many climates.
2. Rotation of crops was practiced for many ages before white contact.
3. Use of organic material for the enrichment of the soil was required.*
4. Irrigation systems and dry farming were first developed by the Indians.

Darwin, in his *Variation of Animals and Plants* says, "Had North America been civilized for as long a period, and as thickly peopled for as long a period as Asia or Europe it is probable that the native wines, walnuts, mulberries, crabs, and plums would have given rise after a long course of cultivation to a multitude of varieties, some extremely different from their parent stocks; and escaped seedlings would have caused in the New and in the Old World much perplexity with respect to their specific distinctness and parentage."

There are over 250 known plants used for medicine among the Indians in the area now included in the United States. Thirty drugs from these plants were used by the whites as family remedies but were not accepted by the medical profession. Of these, 16 were used by both Indians and whites for the same kind of illness.

Twenty-two varieties of plants furnished drugs that were used by doctors, but were not recognized in their medical books. Fourteen of these were used by both whites and Indians for the same purpose.

There were 61 drugs found in plants that at one time or another were recognized in the National Pharmacopœia. Of these 33 were used by the Indians for the same purpose as they were later used by the white doctors. There were 113 plants whose medicinal properties were recognized by the whites. More than one-half of these were used for the same kind of illness by both the Indians and the whites.

In the search for food, medicinal properties were discovered which eventually occupied a place in the Indian's culture separate from that occupied by his food. In his use of medicines he found some to be poisonous; these were discarded. Others were recognized as beneficial for certain ailments. Other remedies affected him differently through creating a reaction which made him feel buoyant or dreamy. He thought the drug was a gift from the Great Spirit, who could commune with him through such a medicine. Such drugs were thought to have supernatural power and were employed in religious rites.

Datura stramonium, Jamestown weed or Jimson-weed, contains a powerful narcotic. Beverly in his history of Virginia says that soldiers, sent to Jamestown to quell the rebellion of Bacon, gathered the sprouts and ate them. "The effect was a very pleasant comedy; for they turned natural fools on it for several days; one would blow up a feather in the air; another would dart straws at it with much fury; another, stark naked, was sitting up in a corner like a monkey grinning and making mows at them; a fourth would fondly kiss and paw his companions and snear in their faces with a countenance more antic than any in a Dutch Droll — a thousand such simple tricks they played and after eleven days returned to themselves again not remembering anything that had passed." Stevenson writes concerning this drug: "The medicine is the property of the rain priests and the directors of the Little Fire and the Cimex fraternities. It is administered with great care and is given medicinally only by the directors of these fraternities. Each director must collect the medicine which he uses and must prepare and deposit prayer-plumes to the sacred plant in order that his treatment may be successfull." The Zuni doctor used this plant to dull the pain of a patient. He used it in fractures and in minor operations, long before anesthesia was considered an essential in surgical practice by Europeans.

Coca has been cultivated for its narcotic effects for many generations. Tobacco, originally a tropical plant, was through domestication raised successfully in many sub-tropical areas in both North and South America. Other narcotics of no medicinal value were used by many primitive people. Narcotics are to a variable degree both an irritant and a poison. They were originally introduced into primitive cultures throughout the world for their effect upon the nervous system. They were first used as a part of religious rites; later such drugs frequently became public property and habit forming. Drug addiction is probably the result of one of the most primitive reactions that man still passes on from one generation to the next without its serving any social or creative purpose in human society beyond the state of savagery.

One cannot make a satisfactory approach to the problem of personal or group hygiene unless one considers the factors which have made both family and group survival possible, as well as the conditions in the environment at any one time that may either promote or endanger such survival. Basic in hygiene are the factors which have aided in living through organic and social evolution to the present time.

Some of the fruits of Indian culture have been credited to them many years after the warring Europeans ruined their civilization. In their wrecked and ruined irrigation systems, their fields and gardens, their methods have been studied and their vegetation preserved for the future use of mankind through war and conquest. The originators have been denied the fruits of their industry. Their influence is still visible throughout the western hemisphere in the Indian population that still survives. Hygiene owes the Indian culture much because it is to the Indians rather than to the Old World, that many developments in modern agriculture are due. It has been estimated that five-sevenths of the world's food today is of American Indian origin. Because of these foods, healthy bodies have populated an old world for ages plagued by deficiency diseases. Hygiene at its best was and must have remained powerless to help raise the standard of living without this contribution of the American Indian.

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*Cieza De Leon, born 1519, in Peru 1532-1550, Parte primera de la Chronica del Peru. (Seville), (Translation by Clements R. Markham).

Cieza says concerning one of the many kingdoms at the time of the Inca conquest that of Chuquimancu, lord of Runahuanac, Huarcu, Mala, Chilca, "From this temple of Parhacamac the roads lead to Chilca and at that place there is a thing that is well worthy of note for it is very strange. It is this—that neither rain falls from heaven, nor does any river or spring flow through the land, and yet the greater part of the valley is full of crops of Indian corn, or roots, and of fruit trees. It is a marvelous thing to hear what the Indians do in this valley. In order to secure the necessary moisture they make broad and very deep holes where they sow their crops and God is served by their growing with the aid of dew alone; but by no means could they make the maize grow if they did not put two heads of sardines to each grain, these sardines being small fish which they catch with nets in the sea. At the time of sowing these fishes, heads are put with the maize in the same hole that is made for the grain, and in this manner the grain grows and yields abundantly. It is certainly a notable thing that in a land where it does not rain and where nothing but a very fine dew falls, people should be able to live at their ease."

The Selective Service System and the Practice of Medicine*

Robert A. Bier, M.D.†
Washington, D. C.

THE Deputy Director of Selective Service, General Hershey, and the Chief of the Medical Division, Dr. L. G. Rowntree, wish to have me express to you their appreciation for the opportunity of having me address the State Medical Association of North Dakota.

To those of you who are physicians in Selective Service, they wish to have you know that they are fully aware of the great sacrifices that have been asked of you as a profession and of the manner in which you have met all requests. We know full well what it has meant to the individual doctor and it is with sincere admiration and gratitude that we watch your work. You are giving of your knowledge, your time, your office space and facilities, all without compensation other than consciousness of work well done. You are making a great contribution from a noble profession. General Hershey wishes not only to express to you his appreciation but the appreciation of the Nation for your help in this great effort. We also wish to express our appreciation to the Committee on Medical Preparedness of the State Medical Society and particularly, the Chairman. It was this committee which was of such help to the Medical Division in the formative period of Selective Service in selecting for us physicians to assist us in our medical work.

Naturally your greatest interest centers about the question "What has the operation of Selective Service revealed to us in reference to the physical condition of the Nation?" This question is one that we should answer as soon as possible but no detailed answer is yet available. The occasion for applying the measuring rod is again with us. We must make the most of this opportunity and face whatever it reveals. Physical requirements of this emergency are not very different from those used in 1917-18 and results can be compared in many respects without discrepancies. We are now requiring some new evidence, for example, serology on all examinees, and as far as possible, X-rays of the chest. The figures to date are running almost constant since the beginning of computation. The local boards are finding about 68 per cent fit for general military duty and induction stations are turning back a little more than 13 per cent. Of the 32 per cent turned down by the local boards, about 20 per cent are rejected for all military duty while 12 per cent are placed in Class 1-B. This means that only 60 registrants out of every 100 physically examined by the local board finally get into the Army.

As you perhaps know there are three classes in which a man may be placed after physical examination: (1) qualified for general military service, Class 1-A; (2) qualified for limited military service, Class 1-B; (3) totally and permanently disqualified for military service, Class 4-F.

Perhaps it is well to define what we mean by "general military duty." By this term we mean that when one is fit for such duty he is physically able to do any service that he may be called upon to perform; to march with a pack for twenty miles and at the end of the march to engage in battle if necessary; to live in barracks with his fellow soldiers, caring for himself and so conducting his barracks life that he is not objectionable to his fellows; to live, if necessary, in the field under trying and uncomfortable conditions without unfavorable reactions to the heat, the cold, or other conditions, and ready at all times to respond in a soldierly manner to the demands that may be placed upon him. I believe that you will agree this order is not small and that the necessity for great care in selecting such men is apparent.

The regulations provide that those who do not meet fully the physical requirements of general military service but who are fit for some services, be placed in Class 1-B. They are not lost but are held until the need is greater. The time may come when we will need them, every one. They may be then inducted and will be assigned where they can best serve. I wish you to bear in mind this class of men, as it is to them that I wish to bring your particular attention later in the paper. The men disqualified for any military service, or Class 4-F, are those who have more serious defects which render them unfit for either of the classifications shown above. This does not mean necessarily that many of these men may not carry on their civilian occupation in the usual manner to which they are accustomed.

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*Presented May 21, 1941, at Grand Forks, North Dakota, before the North Dakota State Medical Association.

†Major, Medical Corps, Medical Division, National Headquarters for Selective Service.

The following slide will give you a chance to visualize our general objective in Selective Service:

Objective: Select an army that will be tops physically, mentally, and morally.

Visualize: 1 year active service, 10 years reserve.

Visualize governmental responsibility from standpoint of:

Insurance
Economic security
Veterans administration
Lifetime patriotic citizenship.

In order to know what your problem will be in regard to men rejected by the Army, I am presenting a slide of the causes of physical rejections. These figures are the latest we have on a large number and are in all probability representative of what we can expect in the future.

CAUSES OF PHYSICAL REJECTIONS

(Based on early reports—preliminary)

Cause	*Percent of Total Rejections* Selective Service	Army
1. Teeth	18.6	19.3
2. Eyes	10.6	13.3
3. Cardiovascular system	10.1	6.2
4. Musculo-skeletal defects	8.4	4.9
5. Mental and nervous	6.2	10.5
6. Ears, nose and throat	4.5	9.5
7. Hernia	4.2	5.3
8. Lungs	3.9	5.0
9. Venereal	3.5	4.4
10. Feet	3.1	3.6

CURRENT STATISTICS

1. Total population	122,000,000
2. Number of registrants	16,500,000
3. Estimated number to be physically examined in five years	6,600,000
4. Estimated total number to be inducted in five years	4,400,000
5. Estimated number to be inducted first year	800,000

ESSENTIALS FOR SUCCESS

1. Complete examination — record entry in each blank; including optionals, pulse, blood pressure.
2. Know, adhere to, administer intelligently all regulations.
3. Avoid extraneous influences, personal, political, and emotional.
4. Accept or reject *only* if certain, otherwise refer to Medical Advisory Board.
5. Review each record for physical, mental and moral defects.

ANALYSIS OF REASON FOR REJECTION OF SELECTEES BY THE ARMY

1. *Local Board*—Attitude of Personal Interest.
   Desire to fill quota.
   Unfamiliarity with regulations and inexperience.
   Imperfect examination and incomplete record.
   Lack of facilities and personnel.
   Recently acquired disqualifying defects (intentional or accidental).
   Malingering.
2. *Induction Board*—Attitude of Army Interest.
   More exacting.
   Experienced (full time) and rigid.
   Individual board variation.
   Subject to human fallibility.
   Difference in medical judgment.

The responsibility of the physician in the present national emergency may be considered in two ways—short term planning and long term planning. The foremost duty is to Selective Service and this is being well taken care of at the present time. The chief need of the physicians in Selective Service is to know the regulations and properly interpret them in order to select suitable men for the Army. What this consists of has already been presented to you.

From analysis of the work being done in Selective Service, we believe that the Medical Advisory Board is not being used by local board physicians as much as we desire to have them. In any case, where a physician is in doubt as to the exact diagnosis or classification of a registrant, such registrant should be referred to the Medical Advisory Board. In this connection I wish to state that when a man is rejected at the Army induction station and it is felt by the local board or the examining physician that there is some question concerning this rejection, the registrant should be sent to the Medical Advisory Board for examination and with a request that the Medical Advisory Board or the appropriate member state in writing the exact status of the registrant in regard to the particular physical condition for which he was rejected. The registrant may then be sent to the induction station with a note stating all the facts in the case. We fully appreciate the heavy burden which is placed on examining physicians and in order to relieve somewhat this burden, we are suggesting three things: First, that more examining physicians be appointed to local boards. An unlimited number may be used as the regulations do not limit the number that may be appointed. Secondly, where there is a large number of physicians appointed to a local board, these physicians may take turns; for example, work one month and off one month or any other arrangement of alternate working and rest periods. Third, when and wherever possible, examination of registrants should be made by the group or team method. As few as two or more men may constitute a team and it is surprising how much work can be done and how much time can be saved by this simple expedient.

There is another duty that may be performed by all physicians, not only those in Selective Service but all others, and this is in the plan of prehabilitation and rehabilitation. Rehabilitation, as you well know, means the correction of remediable defects as found on examination of these registrants. Rehabilitation may enable men to qualify for military service or it may correct some defect, the chief benefit of which would be to them and not to the armed forces. Most of the men placed in Class 1-B at the present time could be rehabilitated so as to qualify for Class 1-A, or fit for general military service. Those men in Class 4-F who are rehabilitated may become Class 1-B so that the correction would be to their advantage only until such time as Class 1-B men are called.

When we speak of Prehabilitation in Selective Service, we imply that type which would be of benefit to the armed forces. Prehabilitation is a word coined by Dr. Leonard G. Rowntree, chief of the Medical Division of Selective Service. This term is used to describe the method whereby a registrant who, before being called for physical examination, could have himself examined by his family physician or other interested agencies to learn if he has any defects that would disqualify him for full or limited military service. Should he discover one or more defects, he could at his own expense or at the expense of the community, should his circumstances warrant it, have these defects remedied in order that he might qualify for military service.

The present peace-time procurement of men and the information gleaned from the mass examination of registrants furnishes us with the knowledge of the present state of health and fitness of the men in this age group. I believe we can also consider this an adequate index to the health of the Nation. By the proper use of this information we may plan a health program that will not only correct a large percent of these defects but enable us to establish measures to prevent them in the future. The Medical Advisory Council to Selective Service, of which I am a member, presented the program of rehabilitation for adoption in its entirety by the medical and dental professions. This offers an opportunity not only for a present nation-wide health program by private physicians, but for a wide-scale plan for the future.

With the large number of rejections because of dental defects, I feel and have always felt that more attention should be directed to dental health by the physicians of this country. In fact, in my experience as a pediatrician and as an instructor in one of our medical schools, I have seen the urgent need for a short course in dentistry for the medical student. When the regulations for Selective Service were written, no provision was made for a dentist to be attached to local boards. It was believed that the examining physician could readily make the dental examination as required by Selective Service. Experience has taught us differently and it has been necessary to amend the regulations to include dentists. This, to me, is an indication of a lack of proper training of our medical men.

There is now issued a Medical Circular No. 2 (dental) which perhaps you have already received. This Circular No. 2, from which the War Department Circular No. 26 is an extract, liberalizes the dental regulations and we hope will be a means of reducing the number of dental rejections.

In addition to the benefit of prehabilitation and rehabilitation to the registrant and the Army, the interest of the private physician and the medical profession is obvious. It is particularly fitting at this time that the American Medical Profession should accept and develop to its utmost possibilities the plan of prehabilitation and rehabilitation. Selective Service has been besieged by several national organizations seeking to offer their services for the correction of remediable defects, which organizations are not necessarily under medical control.

Both of these plans for the correction of remediable defects require a great deal of education, not only of the public but of the physicians as well. First, both the registrant and the physician should become familiar with the physical requirements for men about to enter the armed forces. Second, we must encourage these men to have their defects remedied, stressing the fact that the chief advantage is to themselves, and the initiative must rest on them.

A present need and one of the future is a sustained supply of adequately trained physicians. This means that the medical students who give reasonable promise of becoming acceptable doctors, must be allowed to remain in school until graduation, including not only those who are there now but those who have enrolled for the coming school year. As physicians and outstanding citizens of your community, whether or not you are in Selective Service you can assist in the proper deferment of medical students and physicians. You can do this by bringing to the attention of your community and the public at large the absolute need for the continuation of a supply of physicians. The student who is about to graduate or the first year intern, you can advise to apply for a commission in the Medical Corps Reserve of the Army. The Surgeon General has stated that the War Department will not call to duty any intern until he has completed his first year internship.

The role of the civilian physician has been vastly changed by the methods of modern warfare; such as the bombing of cities. Formerly, the physician left at home was concerned with the usual care of the sick and with the prevention of epidemics. He had an even greater load of work and responsibility as a result of many of his colleagues serving with the armed forces. With the advent of civilian casualties, as a result of air raids, the physician at home becomes to some extent also a military surgeon or, at least, comparable to one. In fact, in some of the countries abroad, the civilian casualties have been even greater than the soldier casualties.

In the present emergency, with the resultant shortage of doctors through service in the armed forces and other causes, it may be necessary for physicians who are about to retire or who have retired to continue or resume active practice. Consultants or senior members of hospital staffs may find it necessary to become more active in hospital work, to take the place of their juniors who are either called to active duty in the armed forces or who have taken on additional burdens of professional work such as Selective Service and practice incident to a shortage of physicians in their community.

Women physicians, both those in practice and especially those not in practice, might be called upon to lend assistance to relieve the burden of their male colleagues. More women should be encouraged to study medicine. Many graduate nurses have been called to service by the armed forces in this emergency and their places must be filled. These places may be filled by older trained nurses, nurses who have become inactive, or practical or undergraduate nurses.

Qualified women may be given short but intensive courses in First Aid, elementary nursing and other instruction which would enable them to assist in clinics, hospitals and other institutions in positions for which the services of a graduate nurse are not imperative. The Red Cross is well equipped to conduct such courses as was demonstrated so successfully in the last war and has been continued on a smaller scale ever since. In other words, in this emergency there should be a plan of organization for adequate civilian care by the limited group of physicians and nurses available.

The shortage of physicians in small towns and rural communities is much more acute than in metropolitan areas. This is not only true during this emergency, but has been an ever-increasing problem for a long time. Some concentrated effort on the part of the medical profession and the country at large should be made to encourage young physicians to settle in smaller communities and rural areas, rather than go to the cities. How this is to be accomplished is a matter I am afraid we shall leave for the present unsettled.

The present emergency calls for extra effort on the part of every one of us in this great democracy and I am sure that when the total score is tallied, the physician will not be found wanting in his patriotism and loyalty to his country, his home and his profession.

The Common Use of the Female Sex Hormones*

Justin L. Conrad, M.D.
Jamestown, North Dakota

"IT is easy to exaggerate the clinical importance of endocrine therapy." This is the first sentence in Sevringhaus's *Endocrine Therapy in General Practice*. Perhaps one would do well to keep that sentence firmly fixed in mind so that the hormones are not used too freely or the patient promised too much. One should remember that these hormones are useful drugs to be used as indicated. They are not cure-alls, and perhaps are even useless in some conditions in which the enthusiast would have us believe they are very effective. And so, my remarks will be confined to the more well known uses of these preparations.

The first and most widely used of these are the estrogenic hormones. Estrogenic hormone is defined as the hormone produced by the ovarian follicle. It promotes the development of the sex characteristics of the female and maintains the normal condition of these characteristics in the normal woman in the child-bearing period. It sensitizes the uterine musculature to the action of the posterior pituitary. It produces the proliferative endometrium of the first half of the normal menstrual cycle, and is believed to act with corpus luteum hormone to form the premenstrual endometrium. Sufficient dosage of estrogenic hormone inhibits the production of gonadotropic hormone by the pituitary gland as in the menopause, but has no effect on the ovary.

The most common use of estrogen is in the treatment of the menopause. Novak points out that in using estrogenic hormone at or near the climacteric age, the physician must be sure that the symptoms he is treating are actually those of the menopause and not those resulting from the stress of rearing a family or from domestic and marital difficulties. Also, of course, one must be sure the symptoms complained of are not those of genuine physical disease. The hot flashes are due to hormone deficiency which are present in the menopause and are objective as well as subjective, for they can be seen and their frequency and severity noted. Novak states that these hot flashes give the best indication as to the severity of the menopause, and their control is the best indication as to the efficiency of treatment. He further states that the control of the hot flashes is a more reliable indicator of the success of the treatment than the vaginal smear for frequently the symptoms are relieved with no change in the vaginal smear. The immediate cause of menopause is the cessation of ovarian function. Therefore, the treatment of the menopause makes use of replacement therapy by administering estrogenic hormone. This treatment is

*Read before the North Dakota State Medical Association annual meeting, Grand Forks, May 19, 20, 21, 1941.

universally accepted and is perhaps the only use of any of the sex hormones about which there is no argument. The hormone has no effect upon the ovary and does not stimulate it to renewed activity. Contrary to occasional statements, it has never been demonstrated that estrogen has any carcinogenic action. Many writers have repeatedly pointed out that if one is going to use a hormone one must use a preparation of established potency, of which there are many.

Of course not all women going through the menopause need treatment and many do not need much, but for the case of average severity it is recommended that she be given 10,000 units intramuscularly every third day for two or three or more doses until her symptoms are ameliorated. As the symptoms recur, this will need to be repeated. Other women do not need doses this large. Some writers insist that much better results are obtained by these intramuscular injections, but Sevringhaus in a late article states that the use of an oral preparation soon to be placed on the market gave equally good results. Sevringhaus also states that an alcoholic solution to be used by rubbing on the skin gave good results. The same author says the mixed estrogens have an advantage over pure estrone which is a synthetic product.

OTHER USES OF ESTROGENIC HORMONE

There are several other conditions in which estrogenic substances have definite value, but as time will not permit full discussion, these will be only enumerated. Certain cases, but not all, of amenorrhea both primary and secondary respond very well to its use. These are probably the cases in which ovulation occurs. Some girls with dysmenorrhea obtain marked relief from its use. Stein and Leventhal demonstrated its efficiency in sterility and believe it is useful in hyperemesis gravidarum. Also there are some patients with menorrhagia who benefit markedly from its use. It should be emphasized that not all cases of these conditions mentioned respond to the use of estrogenic hormone, and there seems to be no definite way by which one may know in advance which ones will be benefited and which will not. Gonorrheal vaginitis in infants responds to large doses given over six weeks.

CORPUS LUTEUM HORMONE

Progestin is the hormone produced by the corpus luteum. It produces the endometrial changes of the latter half of the normal menstrual cycle, the so-called secretory endometrium. It is said to protect the uterine muscle against the action of the secretion of the posterior pituitary, which action would explain its effect in preventing abortion and relieving dysmenorrhea. Until recently, it has been said without doubt to have the primary function of protecting and nurturing the fertilized ovum. It was said that adequate amounts of this hormone must be present to prevent abortion in the first three months. Lately, serious doubts have been cast upon this former concept of the physiology of the corpus luteum.

Until the established opinion of the action of this substance is definitely disproved we should disregard the controversy. The majority of writers have been of the opinion that this hormone has decided value in the treatment of threatened and habitual abortion. Its expense is a handicap but when its use succeeds, the patient will be satisfied. Its use in threatened abortion certainly often seems to be effective. The dose recommended is 2 to 5 mg. daily until all signs of the threatening abortion have passed.

In some cases of habitual abortion it is effective in continuing the pregnancy to term. It is advised that 2 to 5 mg. be given three times a week from the time the diagnosis of pregnancy is made through the first three months. This dose may be decreased gradually so that the patient gets 1 mg. weekly, and at the end of eight months it is discontinued.

In menorrhagia and metrorrhagia, progestin with estrogenic hormone will be effective in some cases. This is only substitutional therapy. Probably, endometrial biopsy with the suction curette should be done the day preceding onset of flow to determine whether or not the corpus luteum effect is present. If the secretory endometrium is present, then the corpus luteum is functioning and this hormone would not need to be given.

THE GONADOTROPIC HORMONES

Anterior Pituitary-like Hormone: This hormone is produced by the placenta and Sevringhaus says it may contribute to the maintaining of the corpus luteum of pregnancy and to inhibit ovulation. According to this author this substance not only does not stimulate the human follicles but may cause some destructive changes and atretic follicles. He says it may be useful in threatened or repeated abortion. Other writers say that it not only is not a gonadotropic substance but may be definitely gonadotoxic. The term "prolan" should be reserved for this substance. This A.P.L. hormone should be used only in undescended testes in boys between the age of 7 years and before the beginning of puberty. In time even this use may come to be avoided because of possible harmful effect upon the testes.

Gonadotropic Hormone of the Anterior Pituitary Gland: Due to the commercial difficulties of securing adequate amounts of this gland, to impossibilities of isolating this hormone from the many produced by the gland, and due to its high protein content its use is not common.

The Gonadotropic Hormone of Pregnant Mare Serum: This hormone is produced by the placenta and is found in the blood serum of the pregnant mare and reaches its maximum concentration about the 70th day of pregnancy. When administered to the human it acts on the ovaries producing maturation and rupture of the ovarian follicle and development of the corpus luteum. This was demonstrated by Davis and Koff in 1937. There are several conclusions reached by the investigators which should first be set down as a basis for treatment in menstrual disorders and sterility. The first is that hypofunction of the ovaries is far more frequently the cause of menstrual disturbances than overactivity. Also, the failure of the ovarian cycle to be repeated is due to the failure of ovulation. Excessive estrogenic effect has never been demonstrated except as a result of therapeutically administered estrogens. Therefore, because of these observations and because estrogen has no effect upon the ovary it would appear that in treating most menstrual disorders that hormone should be used which will produce the growth and development of the ovarian follicle. Of course, endocrine therapy presupposes that there are no pathological processes such as anatomical abnormalities, tumors, or general conditions which are causing the condition. Up to now there has been developed no method to show whether ovarian hypoactivity is due to over- or under-activity of the pituitary hormone. Of course where the ovarian hypofunction is due to over-activity of the pituitary there will be no success with a preparation which will add more stimulation to the ovary. That is one reason for the failure in treating some of the menstrual disorders and some cases of sterility.

Quoting Sevringhaus: "The symptoms and signs, if endocrine, are probably due to deficient amount of secretion or prolongation of the follicular secretion phase. This generalization holds true from menarche to menopause although for varying reasons. There is no way by which to explain the occurrence of menorrhagia in one case, oligomenorrhea in another, amenorrhea in a third, variation in cycle length in a fourth, variations in amount of flow at different times in a fifth woman. In fact it is most common to find all these features occurring at one time or another in the same patient, demonstrating that these are relatively incidental features of the underlying cause: ovarian underactivity."

As has been said, ovarian secretions have no effect on the ovary so that the giving of estrogenic hormone will not improve the condition, although it may, for a time, improve the menstrual rhythm. Therefore, when one desires to restore normal rhythm or improve fertility the treatment should be directed toward stimulation of the ovary. The preparation advised is the hormone of pregnant mare serum. It is relatively free from foreign protein and may be given intravenously or intramuscularly.

The manner of administration advised is to give five to fifteen daily doses hypodermically of 10 units beginning the day of the onset of the menses. If there is amenorrhea the cycles of treatment may be every four weeks until there is a flow, to give information as to the cycle of activity.

Of course the importance of thyroid should not be forgotten, but a discussion of its use does not belong here.

Very great advances have been made in endocrine therapy in the last ten years. It is to be hoped that within the next ten years, simple means of diagnosis of the various dysfunctions and accurate guides in treatment will be available.

A Student Health Auxiliary*

W. H. York, M.D.
Princeton, New Jersey

IN describing for you the organization and work of our Ladies' Auxiliary, I am fully aware that the idea of this coöperative service is not new in medical relations. Many such groups are continually at work in coöperation with medical and other civic institutions. However, it seemed to me that our respective student health services are peculiarly well adapted to benefit from the interests and contributions of such an organization. It is with this thought in mind that I wish to describe the plan of function and some of the accomplishments achieved by our local auxiliary group.

Origin and History. The Auxiliary's origin can best be described in the words of Mr. Phillip Rollins, whose wife is one of the most active members: "In 1902 at the time of the construction of a new gymnasium, one of the University's trustees suggested to some women living in Princeton that they create an organization for two purposes, one being the placing of mirrors and other simple furnishings in such rooms of the gymnasium as would be used as ladies' dressing rooms during the undergraduate dances; the other being the providing of a banner to be awarded to that undergraduate class which should obtain the largest amount of subscriptions to the gymnasium's building fund. So effectively was the banner provided and so satisfactorily were the arrangements for the sub-debutantes to powder their noses, that the women were asked to increase their membership and to assist in the running of the Infirmary. They obeyed the request and, calling themselves the 'Ladies' Auxiliary to the Isabella McCosh Infirmary,' they proceeded to collaborate with the medical staff in an effort to humanize and enlarge Princeton's student health service."

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*Presented at the twenty-first annual meeting of the American Student Health Association at the University of Michigan, Ann Arbor, December 27-28, 1940.

How well they have performed their function can be seen by the concrete evidence of a modern and well-equipped Infirmary building, with an endowment of $274,588.00; the continued effort to promote the efficiency of the infirmary service by gifts of equipment and supplies; and by sympathetic coöperation with members of the medical and nursing staff in dealing with sick students and their parents.

Organization and Accomplishments. The Auxiliary is organized and so administered that it can carry on its program largely through the work of local committee groups. Of these the Membership Committee is perhaps the most important. At the present time there is an enrollment of over 1200 members. The manner in which the membership roll is maintained is a unique feature of the organization.

Every fall a letter is sent to each mother of an entering freshman calling her attention to the organization and its purpose, and including a brief statement of its work. The letter ends in this fashion: "We invite you, as a Princeton mother, to join the Ladies' Auxiliary and share with us in the furtherance of this important work on the campus." At the same time the mothers of all sophomores, who did not join the year previously, are again extended an invitation to membership.

As you will observe, the psychology of this approach is based on the principle that mothers of freshmen will be glad to coöperate with those in the University community who, as parent substitutes, are interested in their sons' general welfare. Whenever possible a personal acquaintanceship is utilized in presenting the plan of operation to a mother or a prospective friend.

Another source of membership is found in the Graduate Council's record of recent alumni marriages. The young bride is at once acquainted with the nature of the Auxiliary and invited to join. Wives of the faculty, wives in the University community, and friends at large are also given an opportunity to join and share in the work of the Auxiliary.

Through these various sources about 150 new members are added to the roll each year. This number approximately equals the number who drop out each year for various reasons and maintains the present level of enrollment. Membership dues are as follows:

Associate Membership	$ 5.00
Sustaining Membership	10.00
Life Membership (payable in one sum)	250.00

The Laboratory Committee. This Committee has performed an invaluable service in keeping all laboratory and physiotherapy equipment up to date and adding new equipment when it is needed for further diagnostic studies. The funds available for these services come from a special laboratory endowment and special gifts.

Among some of the major items of equipment recently made available by the Auxiliary through this committee are the following: a modern shock-proof X-ray unit with timer; a large electric refrigerator; a modern gas-ether anesthesia unit; a super-alpine violet-ray lamp; two infra-red heating units; a binocular microscope; a colorimeter; and numerous smaller items of general laboratory equipment.

A Visiting Committee consists of nine members, one visitor for each month of the college year. The chairman of this committee is notified of all serious illnesses and makes it her business to know if and when parents are arriving. Although member visitors do not often see sick boys themselves, especially the operative cases at the hospital, their primary object is to see the anxious parents as soon as possible after their arrival to offer assistance in every way possible and to show their interest and sympathy.

A Committee on Books and Magazines has charge of the Infirmary library, continually adding new books with special appeal to students who are patients in the Infirmary. They further provide a subscription list of twenty-eight magazines.

A Committee on the House and Garden, from current funds, supplemented from time to time by special gifts from individual members, maintains the house furnishings and the garden. The six sun porches are kept gay with fresh chintz curtains and well supplied with comfortable chairs for ambulatory house patients. Low tables that hold books and current magazines, and radios, both here and in the private rooms, provide football thrills for those unable to attend the games in person. Four of these sun porches overlook the walled garden, which from early spring until late fall is colorful with blossoming shrubs and flowers.

A special feature of the Infirmary is known as the Mother's Room, and consists of a small suite of rooms, most attractively furnished, which is put at the disposal of parents of a seriously ill boy.

In addition to the work and accomplishments of the above standing committee, the Auxiliary maintains an Emergency Fund of approximately $2,000 which is used to assist a needy student in paying for specialized medical or surgical service and any necessary hospital expense. They further contribute the sum of $5,000 annually from their current funds to the operating expense of the Infirmary. This sum is in addition to the earned income from the Infirmary endowment.

Although the Auxiliary as a whole took no active part in the drive to raise funds for the building of our present Infirmary, individual members contributed generously, both in time and money. The credit for raising the sum of $400,000 belongs largely to a Women's Committee of which Mrs. Phillip Rollins was a most efficient chairman. This fund, completed in 1925, made possible the erection of a modern fireproof building furnished and equipped according to the latest standards of hospital improvements.

As a concluding statement I can unqualifiedly recommend the very significant help that will be afforded a student health service through an auxiliary organization composed of interested women.

The
JOURNAL
LANCET

Serves the Medical Profession of
MINNESOTA, NORTH DAKOTA SOUTH DAKOTA AND MONTANA

The Official Journal of the

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MINNEAPOLIS, MINN., JANUARY, 1942

THE NATIONAL PHYSICIAN'S COMMITTEE

Many physicians do not thoroughly understand the real function of the National Physician's Committee. Many feel that the organization may usurp the power and authority of the existing medical organizations. If from the beginning the Committee had been sponsored by the executive heads of existing medical organizations there probably would not have been so much misunderstanding and misinterpretation of its aims and ideals.

To separate it from existing scientific medical organizations, a separate group of men were chosen to establish the National Physician's Committee. The weakness of this policy soon became evident. Instead of every existing medical organization hailing this as a valuable, progressive step, they all sat back and left this new and necessary organization shift for itself. As Fishbein has so aptly said, the existing medical organizations have done all that is possible to disseminate information regarding disease, but because of their scientific nature they cannot be effective in the dissemination of information leading to action in relation to problems concerning government relationships of medicine. The National Physician's Committee has proved to be of great value in this respect. In chaotic times no profession or business is more vulnerable to outside interference than is the medical profession.

With business men assuming great responsibilities for the government, one of the first problems they meet is the health of the nation. Unfortunately they are frequently informed on this subject by men who have little or unreliable information themselves. We are frequently informed that 50 per cent of the draftees are rejected because of physical disability. Our informants infer that this indicates a great neglect on the part of the medical profession. An analysis of the figures shows that a large percentage of those rejected have ailments which have never hindered these men from carrying on their usual pursuits. For the most part they are minor ailments such as bad teeth, eye or ear trouble which have existed from birth, or hernias or other conditions which the men could have remedied readily if they chose to do so.

A short time ago some very influential and wise men broadcasted from the capital, facts relating to our great modern development of medical science and the great facilities of modern medicine for caring for the sick and disabled. Yet they said the profession was negligent in not selling this to the public. They were told very elegantly that since the profession had created such marvelous facilities it was not their duty to go out and sell this to the public. If these wise men would spend their time and energy teaching the public that such facilities existed and how to make use of them, their time would be much more profitably spent.

The National Physician's Committee has demonstrated that no existing medical organization can counteract the effects of such propaganda, as above mentioned. Many medical men are not aware of this organization's work. Literature does not get results. Medical men must be informed in small groups of the real function of the National Physician's Committee. Minneapolis men attending these meetings have been enthusiastic about the organization. Groups were called together mostly through the various hospital staffs. The Deaconess Hospital of Minneapolis has had remarkable success; every member of its staff has contributed to the National Physician's Committee. Several other hospitals have done almost as well. The Hennepin County Medical Society has in all, contributed over $3500. No other county in the United States has exceeded this amount.

Some of our medical men feel that the National Physician's Committee should take steps to introduce prepayment medical plans or something to change our present system of practicing medicine. In the first place the public does not really demand it. The agitation for a change is mostly instituted by social workers, shrewd politicians, medical men who have full-time government jobs, or at least are not taking care of the sick, and others who have a selfish interest in the matter, rather than from any humanitarian viewpoint.

Both our local and state medical organizations have spent much time and thought on every possible change that might be better for the general public. We have plans that could be put into operation at any time it may seem necessary to do so, in order to head off any government control.

So far no satisfactory pre-payment medical plan has been put in operation or been presented in this or any other country. Those county- or statewide plans which have been tried have not been successful financially, and the privately owned methods have not only been entirely unethical and unfair to the medical men, but they have not been proven to be in public demand.

Last summer when the American Medical Association met in Cleveland the House of Delegates went into session with a gloomy outlook. It appeared as if we might at anytime be taken over by the Federal Government and commanded to do their bidding. Determined committees from the American Medical Association as well as from the National Physician's Committee set to work to head this off. The records of their work will become apparent if one reads the November 15, November 29, and December 13 issues of the *Journal of the American Medical Association.* The results recorded in these journals were almost beyond expectation.

Our dynamic president, Dr. Lahey, has been appointed by Washington to head a medical committee to coördinate all military medical work for the present war. On this committee are, also, Dr. Diehl, Dean of the University of Minnesota Medical School, and Dr. Seely, a former University of Minnesota Medical man.

On the fly leaf of the *Journal of the American Medical Association,* December 13, 1941, you will find the statements of the medical heads of both Army and Navy, and of Paul V. McNutt, Director, Office of Defense Health and Welfare Service. Not in the history of American Medicine has so coöperative a spirit existed between the medical profession and the authorities of the Government. To preserve this spirit and to prevent outside influences from disrupting it, is our job. The coöperation of every medical organization and every individual medical man is necessary to hold what we have gained.

J. M. H.

STANDARDIZATION OF PROCTOLOGIC TECHNIQUE

There is perhaps no field of surgery where every surgeon wishes to be a rugged individualist, as in proctology. This seems especially true in performing the operation of hemorrhoidectomy. Each operation seems to inspire some variation of technique based on his imagination. The results are often as bizarre as the ideas.

With many medical men going into the Army and Navy, now might be a good time to lay down certain basic principles to be applied in hemorrhoidectomy. This is especially true since many of the physicians have not been particularly interested in surgery, yet will be required to do operative work if the occasion arises. Specialization has never been given a prominent place in Military Medicine, the theory being that every man should be able to do everything. This, of course, is fundamentally sound for it is impossible to attach a corps of specialists to every ship, fighting unit, or small Army Post. Only in Base Hospitals is it possible to have a complete medical staff.

Standardization of technique should be of great benefit to the man who must of necessity be an all-around specialist. That there is some necessity for this is indicated from the fact that from two Army Posts have come inquiries as to a method of hemorrhoidectomy, and Director of the Surgical Section of the Medical Department Service School, at Fort Sam Houston, has asked for the use of a motion picture film demonstrating hemorrhoidectomy.

W. A. F.

TRANSACTIONS OF
THE MINNEAPOLIS ACADEMY OF MEDICINE

Founded January 17, 1920

Stated Meeting Held at the Minneapolis Club, Thursday, October 9, 1941
The Vice President, Robert L. Wilder, M.D., in the chair

TRACHEOCELE

Dr. Lawrence R. Boies gave a case report of a tracheocele and illustrated it with Kodachrome motion pictures.

CASE REPORT

LEO G. RIGLER, M.D.

I should like to present a case in which a bullet was found in the heart of a male patient. The accidental shooting occurred 37 years before the patient was seen. Cases like this are rare; this is the first one that has ever come to my attention. The finding was obtained through our routine fluoroscopic examination of the chest, which we do on all patients coming to the Out-Patient Department. This patient had no symptoms whatever so that the finding is more of a curiosity than anything else.

I should like to demonstrate the films which were made here because they indicate so well how one can, by various types of X-ray examination, indicate the location and character of motion of a foreign body, such as this bullet.

In the postero-anterior view the bullet can be seen to lie just under the sternum in about the midline in the region of the heart. The shot entered from above, just below the clavicle, and apparently found its way along the ribs to lodge in the anterior wall of the heart. A film made at 1/20th of a second shows the shadow of the bullet sharp and clean cut. At 2/10ths of a second, the bullet appears somewhat blurred because there is, of course, some motion. At 4/10ths of a second one can readily see the sharp outline of the bullet at one point, but there is a blurred shadow extending a distance of about 1½ cm. indicating the motion of the bullet during this period of time. The lateral view shows the bullet lying in the anterior wall of the heart.

We tried to demonstrate the motion of the bullet by using the roentgenkymogram, which is an excellent way of graphically demonstrating motion in the roentgenogram. By making films with the roentgenkymogram in the vertical, the horizontal and at 45 and 135 degree angles from the base line, we are able to demonstrate the up and down, side to side and oblique motion of the foreign body. This indicates that the motion is a circular one rather than a simple side to side displacement. The major motion is, of course, from side to side which goes with the pendulum motion of the heart.

This case is shown largely because it is a curiosity, but it may give some idea what can be done by a roentgen study of various chambers of the heart if there is something opaque within them.

THE CLINICAL USE OF VAGINAL SMEARS

CLAUDE J. EHRENBERG, M.D.

Subjective criteria have generally guided the rather ubiquitous clinical use of the steroids and the gonadotropes in the woman. Objective criteria are available for the purpose, but the technical difficulties and laboriousness of those such as the assays preclude their clinical application. Another as the endometrial biopsy is of such a nature as to prevent its repeated use frequently. One test however, which is free from these limitations is through the interpretation of vaginal smear characteristics. Justifiable criticism may be directed at the accuracy of vaginal smears at present, but newer interpretations of these characteristics usually in conjunction with confirming data by various observers indicate an advance in the direction of greater exactness of the method. A brief and partial review of the subject which is to be the basis of this presentation, may therefore be justified.

The study of human vaginal smears for clinical purposes was introduced as recently as 1933 by Papanicolaou in a comprehensive report which reviewed vaginal smear work in the lower animals and some of the cyclic histological aspects of the human vaginal epithelium. The major portion of the report, however, was concerned with a long and intensive study of the human vaginal smear. In the latter, changes in the vaginal fluid in relationship to the menstrual cycle and in part correlated with ovarian histology were discerned and described. The cyclic changes in the vaginal fluid were divided according to desquamated cell morphology, presence of erythrocytes, leucocytes and mucus into four phases and one stage:

a. Menstrual phase—1st to 7th day.
b. Copulative phase—8th to 12th day.
c. Ovulative stage—12th to 13th day.
d. Proliferative phase—13th to 17th day.
e. Premenstrual phase—17th to next menstruation.

This work added clarity and confirmation to the controversial subject of cyclic vaginal epithelium changes in the human during the menstrual cycle. However, the use of human vaginal smear for study of the menstrual cycle has remained essentially a research procedure. In 1940 Rubenstein reported on his use of the vaginal smear in combination with basal temperature records as a method of study in sterility. His classification of vaginal smear characteristics was basically that of Papanicolaou's, but one additional characteristic was described which he believed indicated corpus luteum function. Some preliminary study of vaginal smears and concurrent endometrial biopsies in our laboratory seems to substantiate his observation. Rubenstein's therapeutic results were striking, particularly in four cases in which ovulation was indicated as occurring during the latter part of menstruation. Vaginal smear study of the menstrual cycle may therefore be advantageous for the observation of sterility factors and could conceivably be of value in the determination of sterile periods for the purposes of contraception.

More recently the same author has shown a distinct correlation between vaginal smear readings and estrogenic hormone assay levels. Although the two determinations are not exact correlates inasmuch as the urinary assay represents estrogen excretion and the smears end organ response to estrogen production, the relationship would appear to be definative. Speculation then, that the vaginal smear study may become of value in the investigation of menstrual disorders, may have some foundation.

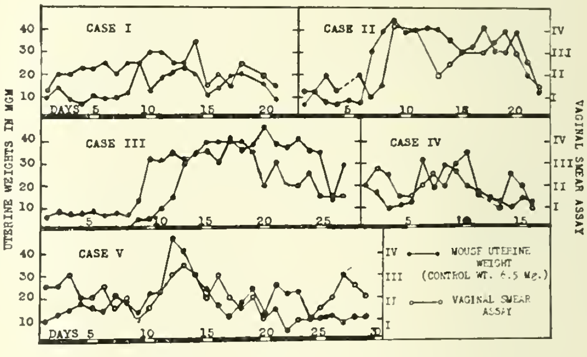

Fig. 1. Correlation of vaginal smear gradings used an assay with actual mouse uterine weight assay. (From Rubenstein.)

Another phase of the use of vaginal smears for clinical purposes and one which has been more widely applied was introduced in 1935 by Papanicolaou and Shorr in a report entitled, "The Action of Ovarian Follicular Hormone in the Menopause as Indicated by Vaginal Smears." This work established vaginal smears as a method of evaluating the effect of ovarian follicular hormone preparations (estrogens) in women with menopausal symptoms. Many authors have contributed to the establishment of the validity of the method and it may be of interest to note that although modifications have been attempted, the original Papanicolaou method of collecting, fixing, and staining the smears remains the standard. A classification was presented which gave a mathematical expression to the results of the therapy. Soon after, Severinghaus adopted the method for use in his laboratory with simplifying modifications. His method of evaluating the effect of therapy through the use of smears has been essentially satisfactory in our laboratory.

During the last year Severinghaus has reported the result of a lengthy study of vaginal smear grading in relationship to the relief of subjective symptoms. The accompanying chart clearly manifests the correlation. Another demonstration of this correlation is in the case of a menopausal woman who received crystalline estrone suspension. The return of subjective symptoms could be predicted from the appearance of the vaginal smears which were taken at frequent intervals.

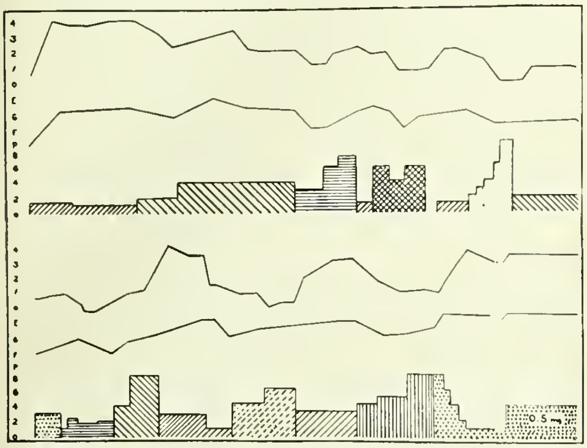

Fig. 2. Comparison of objective and subjective changes in one woman from use of various estrogenic substances. Upper line represents response of vaginal epithelium from 0 (castrate type) to 4 (full estrus smear). Lower line represents subjective relief, e. g.: E—excellent, G—good, F—fair, P—poor. Doses of estrogens in thousands of units orally a day, estriol glucuronide in tablets, stilbestrol in tenths of milligrams. Time elapsed: 17 months. (From Severinghaus.)

It has been clearly established that the estrogen metabolizing rate varies widely in different women and there is also evidence that the same woman reacts differently to the various forms of the estrogens. Thus a woman may respond more readily to estrone than to extradiol, estriol, or the stilbene synthetics, or vice versa. These observations must clearly establish the desirability and necessity for an objective determination of the results of estrogen therapy. In the past, conclusions have been too often based on the subjective results obtained with a standard dose given at definite intervals. Among other clinical uses of the vaginal smear that have been reported are the determination of what has been termed as hypo-ovarianism or ovarian-failure, the differentiation of the psychoneurotic and vasomotor effects of menopause, and the determination of the effects of gonadotropes on the ovary, although in this connection interpretations must be guarded because of the development of antihormones.

A third phase of the clinical use of human vaginal smears was introduced within the last few months by Papanicolaou and Traut. This work is concerned with the diagnosis of uterine cancer by certain characteristics in the vaginal smear. The authors are guarded in their claims but imply their conviction as to the diagnostic reliability of the method.

As a summary, the conclusions may be drawn in regard to the clinical use of the human vaginal smear:

1. There is considerable evidence that the human vaginal fluid undergoes constant cyclic changes during the menstrual cycle, the study of which would seem to be of value in the diagnosis of deranged female genital functions. This value should be enhanced with clearer interpretations as they are developed in correlation with other factors.
2. Distinct value may be attached to the study of vaginal smears as a therapeutic guide in the treatment of symptoms produced by the failing ovary.
3. Vaginal smear study has been suggested as a uterine cancer diagnostic method. Confirmation of this suggestion in itself would justify the clinical use of vaginal smears.

Discussion

Dr. Melvyn B. Sinykin (by invitation): One phase of the study of vaginal smears which I would like to discuss has to do with the recent work published by Papanicolaou and Traut. They were able to detect abnormal cells in vaginal smears of patients later proved to have carcinoma of the female generative tract. Although they do not present statistical proof of the clinical value of this finding, the evidence that abnormal cells appear in the vaginal smears in these cases is irrefutable.

We have started a similar study at the University Hospital and recently encountered a vaginal smear of particular interest. The patient, a 50 year old woman, had no clinical evidence of carcinoma of the uterus except for a small cervical erosion and history of blood streaking in her vaginal discharge. Biopsy of the cervix revealed no malignancy, but curettement of the cervical canal showed areas diagnosed as squamous cell carcinoma.

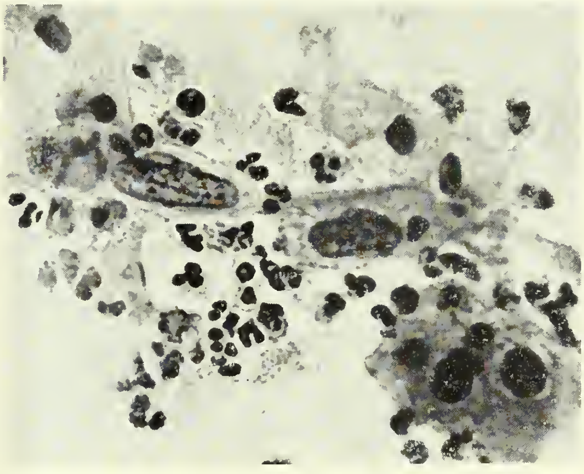

Fig. 3.

The slide shown represents a minute area of the total smear. The two cells in the center could be found only after prolonged search and represent what we believe is shedding of malignant cells into the vaginal fluid. This is of interest because it points to the possibility of detecting malignancy of the female generative tract in obscure cases.

Dr. R. T. LaVake: Dr. Ehrenberg has clearly outlined the possibilities of this test and at the same time has rightly called attention to criticisms, as to its value and dependability as compared with other clinical and laboratory findings, experience, and keen judgment.

I can remember distinctly, what hopes were engendered when Stockard and Papanicolaou in 1917 announced their work on vaginal smears in guinea pigs. After the war, its possible application to human problems stimulated many workers, and evolved a voluminous literature, outstanding examples of which have been shown.

In spite of criticism as to the intrinsic value of the human vaginal smear as compared to other findings, it seems to me that it has a definite place as a helpful adjunct, especially as one test of the efficiency of estrogenic treatment. It must be remembered, however, that presence or absence of cornified cells are not dependent entirely on hormones. Local infection and irritation may influence the findings likewise. Mere swabbing of the vagina with cotton will stimulate cornification. By the same token, cases have been described with vaginal cornification obtained in animals, where on operating, the uterus and ovaries were found to be atrophied. So many complicating factors exist that in the main it has seemed to me that clinical findings are more dependable. The same, however, could be said of the blood sedimentation test; and yet, those of us who have given it long attention realize that at times it is of great value.

The vaginal smear does not involve a difficult technic. Its reading and interpretation is not difficult unless one tries to identify and interpret the types of cells as given by Rubenstein. This to my mind, requires the height of virtuosity.

I would like to ask what experience you have had with the stain advocated by Salmon and Geist. It is simple and informative.

Dr. **Owen F. Robbins**: I would like to ask Dr. Ehrenberg how important it is to use the Papanicolaou stain, whether you go more by color changes or more by debris and leucocytes and clearing of the slides. Even though Dr. LaVake says it is a simple thing it seems to me it is pretty complicated. I would like to know just how important it is to stick to that Papanicolaou technic.

Dr. **Claude J. Ehrenberg**: I am glad that Dr. Sinykin was able to show you the original smear of carcinoma of the cervix. Also, I appreciate Dr. LaVake's discussion. As he says, vaginal smears are easy to procure and stain, but contrarily, they are not easy to interpret. As a guide to estrogenic therapy in menopausal women no great difficulty in interpretation is encountered after a little experience, especially if one follows a plan such as that of Severinghaus. As to the cornification of the vaginal epithelium, the effect of mechanical irritation such as even a cotton tampon, has been well established. Also such factors as recent intercourse or douches have been noted as affecting the vaginal mucosa. However, these effects, while not specifically detectable in the smears, need not be misleading as the facts can be obtained from or the patients may be instructed to avoid the disturbing factors previous to the procurement of the smear. Neither can I agree that clinical findings are more dependable as a therapeutic guide. Because of the great variation in effect of the different estrogens and also because of the individual variation of response in women to the same kind of estrogen, only some objective criteria such as the vaginal smear can avoid long trial and error therapy. To illustrate—some time ago the Abbott Laboratories furnished us with a crystalline suspension of estrone. This preparation can be given hypodermically in doses up to 15, 20 or 25 mg., each mg. representing 10,000 i. u. The thought behind the use of such a preparation is that the crystals would be deposited in the tissues and then act similarly to a pellet. The value of the vaginal smear as an index is demonstrated in the following. In one woman the injection of 15 mg. gave a result which extended over almost a month as demonstrated in the following slide, while in another woman the same amount apparently disappeared or lost its effect within four days. Dependence on clinical findings could only have been very confusing.

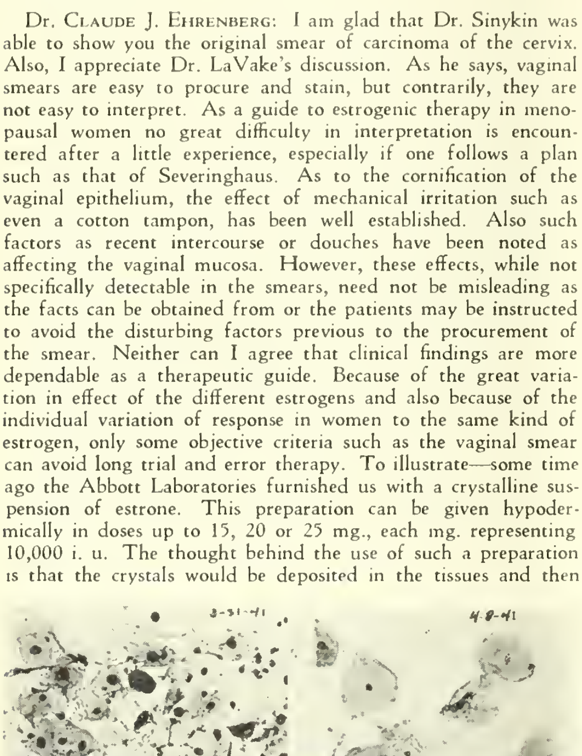

Fig. 4. (Upper left, 3-31-41)—Castrate smear. Note small cells, large nuclei, numerous leucocytes. (Upper right, 4-8-41)—Moderate Estrogenic Effect. Note larger cells, smaller nuclei, leucocytes absent. (Lower left, 4-11-41)—Full Estrogenic Effect. Note large cells, piknotic nuclei, clean appearance of field. (Lower right, 4-22-41)—Estrogenic Effect Receding. Note smaller cells, nuclei slightly enlarged, mucus present, (leucocytes again present in other fields).

The interpretation of vaginal smears for the purpose of determining ovulation is much more difficult and one must familiarize himself with some criteria such as that of Papanicolaou or Rubenstein in order to attempt it. Even then I question whether the interpretations can be accepted until more correlating work has been done. Obviously, the use of vaginal smears for studying disturbances of menstrual function are even more limited. However, the response of the vaginal epithelium, I believe, can be considered an end organ response and as more and more observations are confirmed the method will be enhanced in value.

In answer to the question of staining, particularly that of Geist and Salmon, one must remember that their method which is simply the staining of the vaginal cells with carbolfuchsin, is used only for determining the effect of estrogens in the treatment of menopausal symptoms. Their method gives a fairly good picture of the cell morphology especially the nucleus and is quicker for the limited purpose for which they use it. However, the method of Papanicolaou does give some differential staining which is an advantage in studying the vaginal smear for other purposes. Specific staining reactions, I believe, are not admitted by acknowledged authorities and in this connection our own experience with Shorr's modification of Masson's trichromatic stain, which he stated was specific, has not borne out his contention. We are studying the vaginal smear objectively in relation to the various circumstances mentioned and we believe that as a standard method Papanicolaou's remains as yet unimproved.

THE USE OF BLOOD SUBSTITUTES

Paul F. Dwan, M.D.

Interest in blood substitutes has been awakened by the recent investigations by Scudder, Moon, Levinson and others on the physiology of shock. Further research is needed to clarify the exact nature of the underlying mechanism which results in the imbalance between intravascular and extravascular fluid. A hystamine-like effect has been suggested and Scudder suggested hyperpotassemia as a factor. At any rate, something happens to increase cellular permeability allowing the development of hemo-concentration, reduced blood volume, reduced blood flow and resultant tissue damage. This cycle continues and the irreversible condition known as shock developes.

The choice of a blood substitute depends on our knowledge of the problem presented and an understanding of the means of correcting this situation. If we use two simple laboratory tests, namely the hematocrit reading and the specific gravity of the blood plasma as our indices of abnormal physiology we can rapidly evaluate the nature of each problem presented. These tests are far more accurate in the diagnosis of impending shock than the fall in blood pressure. The latter is a late sign and signifies real trouble.

Although the exact nature of the mechanism has yet to be solved, the dissemination, understanding and practical application of the present knowledge is most important at this time. We are an industrial nation with numerous hazards besetting our daily lives. The increasing civil emergencies and the threat of war makes it necessary for the practicing physician to have a working knowledge of the means at his disposal to combat this problem.

If we review the changes which occur in six common medical and surgical conditions we will understand the factors which will influence our choice of a blood substitute.

Simple fluid loss as seen in vomiting and diarrhea should first be treated by replacement of the fluids by saline, Hartman's solution or glucose. The hematocrit reading and plasma specific gravity are high and dilution is the crying need. If this is not corrected rapidly, primary shock can develop and more sustaining fluids as serum, plasma or whole blood will be required.

Acute hemorrhage results in loss of red cells and plasma proteins so that a low hematocrit and plasma specific gravity results. Crystalline solutions are inadequate in meeting this emergency as they do not remain in the vascular system for a sufficiently long period. Serum, plasma or whole blood must be used.

Severe burns result in tremendous hemo-concentration as shown in the hematocrit and there is a loss of plasma protein as evidenced by the specific gravity. The burned area weeps plasma and the red cells and hemoglobin rise to terrific levels. Water by mouth and crystalline solutions parenterally aggravate the situation by adding peripheral edema and cerebral edema to the picture. The immediate demand is for restoration of serum proteins by intravenous serum or plasma. Whole blood is contraindicated due to the existing polycythemia and trapping of red cells in the capillaries. First aid use of four times concentrated pooled serum given in the field would prevent the severe intravascular loss of fluid by raising the osmotic pressure as shown by Scudder.

Chronic illness, as carcinoma, results in a rise in plasma specific gravity and a fall in the hematocrit when anemia is present. The rise in plasma specific gravity should be counteracted first by crystalline solutions but later held at a normal level by serum, plasma or transfusion. The anemia is, of course, best treated by transfusion.

Nutritional anemia and edema result from starvation on a low protein diet. This situation is rare in this country but will be all too common in Europe this winter. The so-called "war edemas" show a low hematocrit and a very low plasma specific gravity. The latter may drop far below the edema level. Therapy should be directed towards restoration of this level by serum or plasma and subsequent transfusions.

Increased intracranial pressure does not show the marked changes in the hematocrit and plasma specific gravity. The condition is local and correction depends on reabsorption of the excess cerebral fluid by increasing the osmotic pressure of the vascular fluid by hypertonic solutions.

Hughes, Mudd, and Strecker report a small series of cases in which concentrated serum was used for the reduction of increased intracranial pressure. They point out that concentrated blood serum approximates the theoretically ideal hypertonic solution for reducing intracranial pressure, in that it is essentially a solution which has a high osmotic pressure and contains solutes which will remain in the blood vessels after injection to exert a continued osmotic effect.

Their cases include five with cerebral neoplasm, one with subdural hematoma, and one with concussion. Intracranial pressures ranged from 220 and 440 mm. of water. Administration of from 40 to 100 cc. of serum concentrated four times in 50 per cent glucose, was followed by pressure reduction varying from 95 to 275 mm., occurring over a period of 1 to 18 hours. Elevation of blood pressure and transitory increase in pulse rate was noted in all cases. No serum reactions were observed in this series.

A control series with normal intracranial pressure, receiving at weekly intervals 100 cc. each of serum regenerated in one-fourth its original volume of distilled water, in one-fourth the original volume using 50 per cent glucose, showed lowering of intracranial pressure (25 to 70 mm.) following administration of the first two solutions, but no definite results from the use of glucose alone. They conclude that concentrated serum is effective in reducing intracranial pressure for relatively long periods of time, especially in those cases where the pressure is elevated above normal. This type of therapy is not recommended when any elevation of blood pressure may be dangerous.

A parallel series of experiments on dogs was conducted by Wright and Bond in which cisternal puncture was done to obtain continuous readings of intracranial pressure. Their results indicate that a single administration of concentrated serum may produce lowering of increased intracranial pressure for as long as twenty hours.

The restoration of serum protein values and elevation of the osmotic pressure of blood serum for the dehydrating effect on localized or generalized collections of intracellular fluid has been attempted in nephrosis by using concentrated serum. In 1938, Aldrich, et al, reported that this type of serum in doses of 80 to 315 cc. was given to nine patients with lipoid nephrosis and edema. Some diuretic effect resulted from its use, but the method was not entirely satisfactory since this type of treatment failed in three of the nine cases. In the remaining six cases complete and immediate diuresis took place and four of this group not only lost their edema but had normal urine within a few weeks. Patients with favorable response lost weight in a manner similar to that in which weight is lost in a spontaneous renal crisis. This may mean that in some way such a process is initiated by this type of treatment. Intravenous administration of lyophile serum has occasionally been associated with severe reactions in nephrotic children.

We have referred interchangeably to serum and plasma. Both of these substances have the same value where a safe, physiological solution of serum proteins is indicated. Plasma has the disadvantage of containing a fibrin veil which must be removed by filtration before use. The presence of unprecipitated fibrinogen is always a source of potential trouble in the form of further fibrin veil formation. Plasma also contains citrate and saline solutions which dilute the effective therapeutic agent and may in themselves cause reactions. Serum has none of these drawbacks and is rapidly gaining in favor as an infusion fluid. This has been especially true in war time England where the high incidence of bacterial contamination and the necessity of filtration has thrown the use of plasma into disfavor. It is especially urged that great care be taken in hospitals where plasma is redeemed as a by-product of a blood bank. In this instance, the lack of proper checks on sterility, the excessive hemoglobin content due to hemolysis, the absence of proper pooling, the increased potassium level due to hemolysis and the dangers from improper filtration have already led to catastrophies as reported in the medical literature.

Properly prepared serum should be made under the regulations of the United States Public Health Service which demand three separate sterility tests—on the single sample, the pool, and random samples of the finished product. Pools of eight or more specimens are required to insure dilution and neutralization of iso-agglutinins and finally filtration of the pooled material through a bacterial filter to insure the sterility of the material before intravenous use is required.

Wherever properly prepared pooled human serum is available it is probably wise to rely on this source. In isolated communities where such serum is not available, it is laudable to fall back on small scale methods for immediate use if proper precautions are taken. However, rail, air and bus transportation has largely eliminated this condition.

Pooled human serum can be frozen in dry ice and stored in commercial deep freezing units for long periods of time without alteration of the electrophoretic pattern as shown by Scudder. It can be reactivated by immersion in warm water at 37° C.

Desiccation in vacuum from the frozen state can be carried on resulting in a readily soluble crystalline powder which can be kept up to five years when properly sealed in a glass container. This can readily be returned to the liquid state by addition of sterile double distilled water. It has the advantage of instant availability without the delays necessary for blood typing and cross matching and should be kept in reserve in all well equipped hospitals for emergency use. Desiccated material is especially valuable because of its availability for use in concentrated form. This four or five times concentrated material has been shown by Scudder to be far superior to dilute serum in the treatment of shock and burns. It may also be used in cases of hypoproteinemia as described by Aldrich.

In conclusion I would like to stress the importance of familiarity with the problem of blood substitutes. The necessity of having a hematocrit and a specific gravity apparatus on the surgical ward are of paramount importance in determining the need for use of any of these products. Until laboratory investigators can ascertain the answers to the problem of the cause of shock our duty as practitioners lies in knowledge of the available means of diagnosis and therapy. This knowledge, and sound judgment backed by the presence of serum on our hospital shelves would go far toward attaining our goal.

DISCUSSION

DR. ERLING PLATOU: Human serum, both normal and concentrated, have been used rather extensively for treatment of traumatic and surgical shock, hemorrhage, severe burns, hypoproteinemia, associated with wound disruption, for nephrosis and for hypoproteinemia due to diarrhea in infants.

The physiological mechanism which regulates the movement of fluid between the blood and the tissues depends upon a normal semipermeable endothelium. In shock the capillary walls are damaged and allow plasma to escape. The effective differential between the composition of intra and extravascular fluids is thereby lost, and normal water-balance is disturbed.

The determination of the onset of shock depends on the judicious use of the hematocrit, the blood specific gravity apparatus, red cell counting chamber and the hemoglobinometer. Blood pressure readings are obviously of no value because these changes occur too late. In severe burns a tremendous hemoconcentration occurs and can be diagnosed by the above methods. Crystalline solutions aggravate the capillary pathology by adding peripheral and cerebral edema. Whole blood is likewise ineffective and even contraindicated because large numbers of red blood cells are already trapped in the peripheral capillary circulation.

The dangers of keeping serum on hand which has been made without the requirements of the United States Public Health Institute cannot be over-emphasized. At the last meeting of the American Human Serum Association several fatal cases of embolism and infection were reported which had occurred following the use of stored plasma or serum made in small hospitals. I firmly believe that human serum made in small hospitals should be used only when emergency demands this and then it should be used immediately.

The essential precautions for the preparation of human serum are as follows:

1. Selection of healthy, fasting donors.
2. Blood drawn in a closed system.
3. Individual sterility test on each sample before pooling.
4. A pool of eight or more serums is required by U.S.P.H.S. regulations.
5. Addition of a suitable preservative after first sterility test.
6. Filtration through a bacteriological filter.
7. Second sterility test on filtered pool.
8. Third sterility test on final containers.
9. Injection of animals (toxicity test).

DR. CHARLES MCKENZIE: I would like to ask three questions: (1) What is the source of your supply; (2) are there any possibilities of using placental blood as a source of supply; and (3) what is the possibility of using the blood of animals as a source of serum or plasma?

DR. PAUL DWAN: The source of our supply is normal healthy young adults, a lot of them medical students.

The possibility of using placental blood is something I was going to talk to you about. I do not know why it cannot be used. Dr. Wangensteen has been doing this work on normal bovine serum. The Harvard group is working on the fractionated bovine serum. The alpha albumin fraction of bovine serum has been given to a small group of volunteers without serious reactions.

DR. R. T. LAVAKE: This preparation must be similar to that brought to my attention by a Sharp & Dohme detail man. The advantage of such a preparation, and simple technic of administration, if a blood bank is not at hand and before donors can be found, typed and cross matched, is obvious. To those of us who have used blood transfusion extensively in all conditions accompanied by hemorrhage and shock since our experience at the front in the last World War, the saving value of this preliminary treatment arouses great hopes and enthusiasm.

DR. PAUL DWAN: The material sold by Sharp and Dohme is human plasma which requires filtration. The product of the Minnesota Human Serum Laboratory is serum and requires no filtration.

DR. ORWOOD J. CAMPBELL: The gastric surgeon has a problem in preparing some of his patients whose serum protein is low. We have found that the administration of normal human serum does not raise the protein level very rapidly. The concentrated serum is the logical preparation to use and should restore normal levels relatively quickly.

DR. C. J. EHRENBERG: May I ask if sorbital may be used as the diluent for desiccated serum? In cases of eclampsia where serum protein levels may be already low and where a dehydrating fluid is also desirable, the combination might be effective.

DR. PAUL DWAN: I do not know whether anyone has tried this combination. The use of four times concentrated serum, that is, 250 cc. equivalents of desiccated serum dissolved in 60 cc. of distilled water has been shown to have a sustained effect in reducing increased intra-cranial pressure. Hypertonic, crystalline solutions as 50 per cent glucose have failed to show this sustained effect. Foreign substances such as acacia have been pretty well abandoned because of their unphysiological nature.

ERNEST R. ANDERSON, M.D., Secretary.

Book Reviews

William Henry Welch: and The Heroic Age of American Medicine, by SIMON and JAMES THOMAS FLEXNER; 539 pages, 26 illustrations; New York, Viking Press, 1941. Price $3.75.

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This interesting biography of the distinguished Dr. Welch is a work of love. The two Flexners, father and son, must have loved the man as much as did all the other scientists who came to know him. They did a tremendous amount of documentary research to prepare the book, as is evident by the detailed bibliography.

The story of Dr. Welch's career is a history of the foundations of modern scientific American medicine, and with its complete index, the book can find its place as a reference to this period of medical history.

Dr. Welch, the son of a country doctor, was on the "groundfloor" in development of pathology, bacteriology, medical education, and many other medical fields. He guided the course of Johns Hopkins Medical School from its earliest days, and the anecdotes about his experiences give a colorful picture of the man himself.

Primer of Allergy, by WARREN T. VAUGHAN, M.D., Richmond, Virginia. St. Louis: C. V. Mosby Co. Price $1.50.

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The *Primer of Allergy* is an invaluable guide book for these 15 to 50 per cent of Americans who must find their way through and out of the maze of the strange and tantalizing state of allergy. Because of the innumerable causative factors of allergic disorders, because of the many and newer experimental facts that as yet have not been tried and tested by physicians and because of the chaff that of necessity has accumulated along with the grain, this small book fills a gap for both physicians and patients.

If the reviewer were afflicted with allergy—he would quickly buy this little Primer of 120 pages. He would first familiarize himself with the terminology so clearly discussed on pages 18 to 20. Then he would turn to the last part of the book on "General Orders and Directions to the Patient." He would read and reread this part, line by line, just as he learned Shakespeare when a sophomore student. Then if there were time to browse and relax he would turn to the middle of the book.

News Items

Dr. Gerald F. Brown, formerly on the staff of the Wisconsin General Hospitals at Madison, Wisconsin, where he completed a three year residency in obstetrics and gynecology, has joined the staff of the Grand Forks Clinic, Grand Forks, North Dakota, in the section on obstetrics and gynecology.

The Minnesota State Medical Association broadcasts weekly at 10:45 o'clock every Saturday morning over Station WCCO, Minneapolis, Station WLB, University of Minnesota, and KDAL, Duluth. The speaker is William A. O'Brien, M.D., director of postgraduate medical education, Medical School, University of Minnesota. Dates and subjects for January are as follows: January 3—Thyroid Gland, January 10—Pituitary Gland, January 17—The Pancreas, January 24—Adrenal Gland, January 31—Dental Health Education.

Dr. D. S. Baughman, Madison, South Dakota, is the new president of the Sioux Valley Medical association. He succeeds Dr. E. A. Kilbride of Worthington, Minnesota. Other officers are: Dr. Will Donahue, Sioux Falls, vice-president; Dr. R. H. McBride, Sioux City, secretary; and Dr. Frank Winler, Sibley, Iowa, treasurer. Censors are Dr. L. R. O'Toole, LeMars, Iowa; Dr. M. Hyden, Sioux Falls, South Dakota; Dr. Leo Killian, Wayne, Nebraska; and Dr. C. L. Sherman, Luverne, Minnesota.

Dr. Roland G. Sherer, Bozeman, Montana, was recently elected president of the Gallatin County Medical society. Dr. R. A. Williams, Manhattan, was elected vice-president and Dr. A. D. Brewer, secretary-treasurer.

Dr. John H. Moore of Grand Forks, North Dakota, was elected president of the Central Association of Obstetricians and Gynecologists at the annual meeting held in New Orleans, October 1941. The next annual meeting of the association will be held in Des Moines, Iowa, in the fall of 1942.

The Fall meeting of the North Dakota Academy of Ophthalmology and Otolaryngology was held at the Veteran's hospital, Fargo, Saturday, November 29. Dr. A. E. Spear of Dickinson presided. Dr. Henry P. Wagener of Rochester presented an illustrated address on "Cardiovascular Changes in the Retina." Many clinical cases were available for examination. Dr. Rolfe Tainter of Fargo acted as chairman of the committee on arrangements for the meeting.

Dr. Robert B. Radl has returned to the Quain and Ramstad clinic, Bismarck, North Dakota, after completing one year of duty with the medical department of the U. S. Army as medical officer at state headquarters for selective service at Fraine Barracks. He will continue his duties at selective service headquarters on a part-time basis.

Dr. John H. Moore, of Grand Forks, North Dakota, was one of the guest speakers at the annual meeting of the Sioux Valley Medical Society held at Sioux City, Iowa, December 3 and 4, 1941. He spoke on the subject, "The General Practitioner, a Teacher of Better Obstetrics."

Dr. T. F. Walker, secretary of the Montana State Medical Association, reports that plans for a state-wide emergency medical service for civilian defense have been put into motion. A corps of trained first aid workers, an ambulance service, first-aid posts, and a central emergency station are contemplated for each community. The plans, Dr. Walker adds, will be modified according to needs and facilities of the individual communities.

Dr. Maysil M. Williams, North Dakota state health officer for 12 years, has requested a year's leave of absence starting January 1. She has been offered a post as district officer by Dr. John L. Rice, New York city commissioner of health. Dr. Williams is the only woman state health officer in the nation.

New president-elect of the St. Louis County Medical society is Dr. C. O. Kohlbry, Duluth, Minnesota. He will take office in 1943 and will succeed Dr. Gordon C. MacRae, Duluth, who will head the organization during the ensuing year. Other officers chosen to serve next year are: Dr. R. B. Bray, Biwabik, vice-president, and Dr. R. P. Buckley, Duluth, secretary-treasurer.

Dr. D. V. Boardman, Twin Valley, Minnesota, was elected president of the Red River Valley medical society at the annual meeting held in Crookston in December. Dr. A. S. Berlin, Hallock, was chosen vice-president and Dr. C. L. Oppegard, Crookston, was re-elected secretary-treasurer.

AMERICAN RED CROSS APPEALS FOR $50,000,000 WAR FUND

Calling for the united support of the entire nation the American Red Cross has appealed for a special war fund of $50,000,000 to carry on and expand its work among Army and Navy personnel. The appeal was broadcast to the nation through major radio networks by Red Cross Chairman Norman H. Davis.

In preparation for just such an emergency as the country now faces the Red Cross has been spending funds at the rate of more than $1,000,000 a month. However, with war in the Pacific now a reality, the traditional Red Cross responsibilities to the nation and its armed forces have increased manifold and steps were taken immediately to meet these obligations, Chairman Davis said.

"Millions of Americans today desire to demonstrate their will to victory," the chairman said. "Not all can be in the armed forces, not all can volunteer their services for humanitarian work, but all can volunteer their dollars to arm the Red Cross to be their representative at the scene of battle and distress."

LIST OF PHYSICIANS LICENSED BY THE MINNESOTA STATE BOARD OF MEDICAL EXAMINERS ON NOVEMBER 13, 1941

BY EXAMINATION

Name	School	Address
Arthur, Lawrence Milton	U. of Minn., M.B. 1940	Mpls. General Hospital, Minneapolis, Minn.
Bayliss, Milward	U. of Chicago, M.D. 1941	1853 W. Polk St., Chicago, Ill.
Benson, Allan Joseph	U. of Minn., M.B. 1941	706 Delaware St. S.E., Minneapolis, Minn.
Blaisdell, Jack Schoonmaker	Yale U., M.D. 1940	Mayo Clinic, Rochester, Minn.
Botha, Eleanor	U. of Minn., M.B. 1941	University Hospital, Minneapolis, Minn.
Brandes, Robert Warren	U. of Minn., M.B. 1941	Mpls. General Hospital, Minneapolis, Minn.
Brigham, Charles Fay, Jr.	U. of Minn., M.B. 1941	Ancker Hospital, St. Paul, Minn.
Brilhart, Kenneth Bortner	U. of Oregon, M.D. 1940	Mayo Clinic, Rochester, Minn.
Brindley, George Valter, Jr.	U. of Texas, M.D. 1939	Mayo Clinic, Rochester, Minn.
Cooper, Talbert	Emory U., M.D. 1939	Mayo Clinic, Rochester, Minn.
Corbitt, Richard Wylie	U. of Maryland, M.D. 1939	Mayo Clinic, Rochester, Minn.
Crawford, James Harry	U. of Minn., M.B. 1938, M.D. 1939	University Hospital, Minneapolis, Minn.
Davidson, John Griffiths	U. of Minn., M.B. 1941	St. Mary's Hospital, Duluth, Minn.
Downing, George Columbia	Stanford U., M.D. 1940	Mayo Clinic, Rochester, Minn.
Emerson, Edwin Elroy	U. of Iowa, M.D. 1940	Proctor, Minn.
Erickson, Donald Johan	U. of Colorado, M.D. 1940	Mayo Clinic, Rochester, Minn.
Fazen, Louis Edward, Jr.	Northwestern, M.B. 1940, M.D. 1941	Ancker Hospital, St. Paul, Minn.
Fahlund, Geo. Thorwald Rudolph	Rush Med. Col., M.D. 1938	Mayo Clinic, Rochester, Minn.
Graham, Frederick Martin	Northwestern, M.B. 1940, M.D. 1941	Mayo Clinic, Rochester, Minn.
Hammes, Ernest Macfarlane	Harvard, M.D. 1941	Ancker Hospital, St. Paul, Minn.
Hanson, Carl Alfred	U. of Minn., M.B. 1940	Mpls. General Hospital, Minneapolis, Minn.
Hanson, Norbert Orrin	U. of Minn., M.B. 1941	Ancker Hospital, St. Paul, Minn.
Hayden, Charles Gilbert	U. of Minn., M.B. 1940	Mpls. General Hospital, Minneapolis, Minn.
Haynes, Allan Louis	U. of Louisville, M.D. 1938	Mayo Clinic, Rochester, Minn.
Hilton, Hiram David	Rush Med. Col., M.D. 1939	Mayo Clinic, Rochester, Minn.
Hodgson, Jane Elizabeth	U. of Minn., M.B. 1939, M.D. 1940	Mayo Clinic, Rochester, Minn.
Hoyne, Robert Maclay	Northwestern, M.B. 1940, M.D. 1941	Mayo Clinic, Rochester, Minn.
Hultgen, William James	Loyola, M.D. 1941	Mpls. General Hospital, Minneapolis, Minn.
Hunter, Oscar Benwood, Jr.	Georgetown U., M.D. 1940	Mayo Clinic, Rochester, Minn.
Jessup, Richard	Johns Hopkins, M.D. 1939	University Hospital, Minneapolis, Minn.
Johnson, Howard Elmer	U. of Minn., M.B. 1941	Miller Hospital, St. Paul, Minn.
Kauvar, Abraham Judah	U. of Chicago, M.D. 1939	Mayo Clinic, Rochester, Minn.
Keil, Marcus Augustine	U. of Iowa, M.D. 1940	5231 Xerxes Ave. S., Minneapolis, Minn.
Kennedy, Thomas James	U. of Minn., M.B. 1941	1721 Portland Ave., St. Paul, Minn.
Keskey, Theodore John	U. of Minn., M.B. 1940, M.D. 1941	Dwight Mfg. Co., Alabama City, Ala.
Koepke, Earl Hilmer	U. of Illinois, M.D. 1941	Ancker Hospital, St. Paul, Minn.
Larson, Ralph Hertrich	U. of Minn., M.B. 1940, M.D. 1941	Tenney, Minn.
Latchem, Charles Wells	Duke U., M.D. 1939	Mayo Clinic, Rochester, Minn.
Lima, Ludvig Reinhart	U. of Minn., M.B. 1940, M.D. 1941	Pioneer Hall, U. of Minn., Minneapolis.
Lovshin, Leonard Louis	U. of Wis., M.D. 1939	Mayo Clinic, Rochester, Minn.
Martin, William B.	U. of Minn., M.B. 1941	Milwaukee Co. Hospital, Wauwatosa, Wis.
McMillan, James Thompson, III.	U. of Minn., M.B. 1941	Presbyterian Hospital, Chicago, Ill.
Messler, Joseph Dicus	U. of Cincinnati, M.B. 1939, M.D. 1940	Mayo Clinic, Rochester, Minn.
Meyer, Alfred Charles	Northwestern, M.B. 1939, M.D. 1940	Mayo Clinic, Rochester, Minn.
Murphy, Joseph Emmett	U. of Minn., M.B. 1940	Mpls. General Hospital, Minneapolis, Minn.
Nay, Richard Marion	Indiana U., M.D. 1938	Mayo Clinic, Rochester, Minn.
Nesse, Gerhard Martin	U. of Minn., M.B. 1941	Ancker Hospital, St. Paul, Minn.
Nixon, Robert Read	Duke U., M.D. 1940	Mayo Clinic, Rochester, Minn.
O'Keefe, James Patrick	Marquette U., M.D. 1941	Norwood Hospital, Birmingham, Ala.
Porter, Charles Bagley	Johns Hopkins, M.D. 1939	Mayo Clinic, Rochester, Minn.
Russ, Frank Henry	McGill U., M.D. 1939	Mayo Clinic, Rochester, Minn.
Scales, James Russell	Indiana U., M.D. 1938	Mayo Clinic, Rochester, Minn.
Schafer, Leon Anthony	U. of Minn., M.B. 1940, M.D. 1941	Mpls. General Hospital, Minneapolis, Minn.
Scheetz, Raymond John	Ohio State U., M.D. 1940	Mayo Clinic, Rochester, Minn.
Seefeld, Philip Henry	U. of Pennsylvania, M.D. 1939	Mayo Clinic, Rochester, Minn.
Sevenants, John Julius	U. of Minn., M.B. 1941	Mpls. General Hospital, Minneapolis, Minn.
Seybold, William Dempsey	U. of Texas, M.D. 1938	Mayo Clinic, Rochester, Minn.
Sher, Lewis	U. of Minn., M.B. 1940	Mpls. General Hospital, Minneapolis, Minn.
Smalley, Raymond Edwin	Northwestern, M.B. 1939, M.D. 1940	Mayo Clinic, Rochester, Minn.
Stout, Hugh Albert	Oklahoma U., M.D. 1937	Mayo Clinic, Rochester, Minn.
Taylor, Charles Bruce	U. of Minn., M.B. 1940, M.D. 1941	U. of Minn., Dept. of Phys., Minneapolis.
Todd, Ramona Lucile	U. of Minn., M.B. 1941	University Hospital, Minneapolis, Minn.
Vadheim, Lewis A.	U. of Minn., M.B. 1941	Mpls. General Hospital, Minneapolis, Minn.
Wetzel, Earl Valentine, Jr.	U. of Minn., M.B. 1940, M.D. 1941	Little Falls, Minn.
Wheeler, David Riddell	U. of Minn., M.B. 1940, M.D. 1941	2212 Girard Ave. S., Minneapolis, Minn.
Wikoff, Howard Max	U. of Minn., M.B. 1940	Mpls. General Hospital, Minneapolis, Minn.
Wilhelm, Agatha Marie	Northwestern, M.B. 1935, M.D. 1936	Mayo Clinic, Rochester, Minn.
Winter, Irwin Floyd	Rush Med. Col., M.D. 1939	Mayo Clinic, Rochester, Minn.
Zuschlag, Ella	U. of Texas, M.D. 1939	U. of Minn., Dept. of Path., Minneapolis.

Protective Barrier

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Many physicians regard Vi-Penta Perles and Vi-Penta Drops as a protective barrier for those whose resistance is low, particularly during the winter months. These multivitamin preparations are especially helpful to patients subject to recurring colds and other respiratory infections.

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BY RECIPROCITY

Name	School	Address
Batty, John Langdon	U. of Neb., M.D. 1938	Adams Hospital, Hibbing, Minn.
Christensen, Clarence Henry	U. of Iowa, M.D. 1940	2019 E. 2nd St., Duluth, Minn.
Dorwart, Harry E.	Creighton U., M.D. 1927	Granite Falls, Minn.
Karleen, Bernard Nicholas	U. of Minn., M.B. 1938, M.D. 1939	Balaton, Minn.
Palmer, Clara Frances	U. of Okla., M.D. 1940	State Hospital, Moose Lake, Minn.
Preston, Frederick Willard	Northwestern, M.B. 1939, M.D. 1940	Mayo Clinic, Rochester, Minn.
Ruona, Martin Albert	Marquette U., M.D. 1937	Federal Correctional Inst., Sandstone, Minn.
Stilwell, George Giles, Jr.	Wayne U., M.B., 1934, M.D. 1935	Mayo Clinic, Rochester, Minn.
Wallace, William Byron	Stanford, M.D. 1938	Mayo Clinic, Rochester, Minn.
White, Carl Wilma	Jefferson Med. Col., M.D. 1923	State Hospital, Rochester, Minn.

NATIONAL BOARD CREDENTIALS

Abbott, Kenneth Harvey	Col. of Evang. M.D. 1936	Mayo Clinic, Rochester, Minn.
Bruder, Victor Francis Joseph	Loyola U., M.D. 1937	135 E. King St., Winona, Minn.
Campbell, Charles Macfie, Jr.	Harvard U., M.D. 1937	Mayo Clinic, Rochester, Minn.
Treusch, Jerome Victor	Northwestern, M.B. 1939, M.D. 1940	Mayo Clinic, Rochester, Minn.
Walker, Stephen Archie	U. of Minn., M.B. 1940, M.D. 1941	Mpls. General Hospital, Minneapolis, Minn.

SIXTH DISTRICT MEDICAL SOCIETY, NORTH DAKOTA

The Sixth District Medical society met in Bismarck, December 2, 1941. After dinner had been served the following program was given:

1. Diseases of the Vascular System with a Report of papers on this subject given at the American College of Surgeons meeting in Boston. Thrombophlebitis, embolism and the use of heparin were particularly discussed—Dr. N. O. Ramstad.

2. Arteriosclerotic Heart Disease—Dr. J. O. Arnson. Questions and discussion followed.

The annual business meeting was held and the following officers elected for 1942:

President—Dr. George Monteith, Hazelton; vice-president—Dr. R. H. Waldschmidt, Bismarck; secretary-treasurer—Dr. W. B. Pierce, Bismarck; censors—Dr. W. H. Bodenstab and Dr. F. B. Strauss, Bismarck; delegates—Dr. R. H. Waldschmidt, Bismarck; Dr. O. T. Benson, Glen Ullin; Dr. C. C. Smith, Mandan.

NATIONAL SOCIAL HYGIENE DAY

Sixth National Social Hygiene Day, one of America's leading public health events, will be observed on Wednesday, February 4, 1942, Dr. Walter Clarke, executive director, American Social Hygiene Association, has announced.

With the theme, *Keep America Strong, Help Build Better Health,* this year's Social Hygiene Day is directing special attention toward the full realization of the menace of organized prostitution in areas adjacent to concentrations of armed forces and in industrial centers.

Dr. Ray Lyman Wilbur, former Secretary of the Interior and president of the American Social Hygiene Association, warned America that the nation's defense also depends on a healthy civilian population.

"The good work begun in national control will be cancelled, the declining attack rate of syphilis and gonorrhea will be swiftly reversed, unless to our concern with munitions and maneuvers and equipment we add specific attention to the protection of our men in the armed forces and in the factories which supply our materials," Dr. Wilbur said.

Advertiser's Announcements

ECONOMICAL LIVER THERAPY

An interesting report (Am. J. M. Sc. 202:408, Sept. 1941) of a comparison between the therapeutic effectiveness of an extremely concentrated liver extract ("Reticulogen" [Parenteral Liver Extract with Vitamin B_1, Lilly]) and less concentrated preparations shows a considerable saving to the physician and hospital using the former. Forty cases of pernicious anemia were treated, thirty-five for periods of from two to four years, and control cases were followed over the same period. Red blood-cell and hemoglobin levels were satisfactorily maintained, neural symptoms were controlled or actually improved, and the patients were able to combat successfully many types of acute and chronic disease almost as effectively as the average population. There was no evidence that this medication was lacking in any protective factor since nearly all of the patients received as much benefit as could be expected from any extract.

MANNITOL HEXANITRATE NOW SUPPLIED BY SQUIBB AT "REASONABLE COST"

Mannitol Hexanitrate, a drug first synthesized in 1895, but little used because it has been too expensive, is now being supplied at reasonable cost by E. R. Squibb & Sons, New York. The development of a relatively less difficult and less expensive method of synthesis has made this possible.

Mannitol Hexanitrate is an effective vasodilator with a prolonged action. It is indicated for prophylaxis of repeated anginal attacks and in high blood pressure to afford symptomatic relief. It is not curative.

The action of Mannitol Hexanitrate is similar to that of erythrityl tetranitrate, differing in that it is less rapid but more prolonged. This more prolonged action is due chiefly to the fact that it is less soluble than the erythrityl compound. The longer duration of therapeutic action gives Mannitol Hexanitrate the advantage of requiring less frequent repetition of the dose.

Mannitol Hexanitrate Squibb is supplied in tablets containing ¼ grain and ½ grain each, in bottles of 100 tablets.

"DEPRESSION OR NO DEPRESSION, WAR OR NO WAR"

Since 1930, month after month, a unique series of educational-to-the- public advertisements have appeared on the first page of *Hygeia.* The sponsor's name, Mead Johnson & Company, has to be looked for with a magnifying glass, and appears only for copyright purposes. Not a product is ballyhooed. Instead, appear good, clean, convincing reasons, with choice illustrations, why mothers should seek pediatric advice *from their physicians.*

The
JOURNAL
LANCET

Minneapolis, Minnesota
February, 1942

Vol. LXII, No. 2
New Series

Reflections on Medicine in Review

S. Marx White, M.D.
Minneapolis, Minnesota

Does one wish to spend an evening or two in a review of the technical literature on which the medical mind was nourished two generations ago? Of the men represented in the pages selected for republication from the *Northwestern Lancet* from 1870 to 1900, not one lives in the flesh today.

Many of the subjects treated are dead because solved, and some are very much alive. When Stone wrote on ovaries in 1870, he could not have dreamed that the battle ground would move from extirpation as offenders to preservation, and hormonal substitution. When Eitel pioneered in rubber gloves in surgery, he might have envisioned their universal adoption, but could scarcely have thought they might be rationed because of a world at war. The first joint paper anywhere in medical literature by W. W. Mayo and W. J. Mayo is here, dated 1888.

Every reader interested in medical progress will enjoy a unique experience in the perusal of this delightful review of generations past.

Rubber Gloves in Surgery[*][†]

G. G. Eitel, M.D.

Minneapolis, Minnesota

SINCE the introduction of antiseptic and aseptic methods great results are being obtained in surgery as compared with those of former times. It is fully enough established that if no septic or pus-producing germs are brought in contact with the wound, other things being equal, there will be no hindrance to the healing process, nor will any constitutional disturbance be produced. To insure absolutely against the introduction of germs at all times and under all circumstances is not the easiest task.

The fine, smooth skin surface can in most instances, especially if we have plenty of time at our disposal, be brought into an aseptic condition by our well-known antiseptic methods. The instruments, gauze, sponges, all suturing and ligaturing material, etc., can always be made aseptic by the application of either moist or dry heat. But when we come to the sterilization of the hands of the surgeon and those of his assistants, we meet with a far more difficult proposition. The hands are, in the first place, not as easily rendered perfectly clean as most fields of operation, even if plenty of time is spent in washing and scrubbing them with various antiseptic solutions. There are always liable to be fissures and defects of various kinds in the skin and nails, from which the micro-organisms are not easily dislodged. Even if the surface of the hands be perfectly clean at the beginning of an operation, we can have no assurance that they will remain so for any considerable length of time. By working, using more or less force, as is frequently required, especially in some difficult cases—hysterectomies, for example—bacteria that may have been lodged beneath the surface of the skin in glands or in some other depressions may be brought to the surface through muscular action, pressure against instruments, etc., and then come in contact with the wounds, while in due course of time we wonder how infection can possibly have taken place.

It is a fact, established beyond question, that under favorable circumstances pyogenic micro-organisms may be brought into contact with the peritoneum and other tissues of the body and no serious disturbance follow. It is safe to say that the healthy peritoneum possesses greater power of resistance than adipose tissue, and possibly greater than muscular and aponeurotic tissue. We have often seen this after an abdominal section, where the intestinal and parietal peritoneum have been freely handled and even wounded when no apparent peritonitis followed. But in the same case an abscess in the abdominal wall, the so-called stitch abscess, followed, which, of course, fortunately got well in due time.

Now, since it is hardly possible to make the hands of the surgeon and his assistants absolutely aseptic, even under the most favorable circumstances, the writer is perfectly convinced that by covering the hands with gloves made of fine elastic rubber, all danger of infection from the skin, nails, etc., can be entirely obviated.

It may not be out of place, I think, to state that the writer has mastered the known methods of aseptic and antiseptic procedure, and has always exercised as much care and precaution as can anyone engaged in the practice of surgery, but in spite of all diligence, it has been his misfortune, even at times when least expected, to experience infection, especially in adipose tissues, and in two instances, where a great deal of manipulating was required in difficult fibroid tumors of the uterus, septic peritonitis and death.

About two years ago he adopted the use of rubber gloves in all abdominal operations, as well as in all other cases where he wished to be absolutely certain against infection, and he is pleased to state that not a drop of pus or any other sign of infection has occurred in his practice since that time. The gloves that he has most frequently used, and found most satisfactory, are known as the standard seamless gloves, made by the Miller Rubber Company, of Akron, Ohio. They are tough, durable, and fit the hands very snugly. Three grades in thickness are to be had. For my own hands and for the assistants who thread the needles, I prefer the finest make. For all other assistants the medium weight is preferred. Of course, the heavier gloves stand more hardship and wear, and are not easily torn. If the gloves are handled with care they can be used in from twenty to thirty operations, extending over a period of two or three months.

For sterilization, the gloves are wrapped in a towel or piece of gauze and placed in the boiler or sterilizer, together with the instruments, and thoroughly boiled in plain water for about fifteen minutes. They are then removed from the boiler with sterilized forceps and immersed in sterilized water, with which they should be well filled before an attempt is made to put them on. After the hands have been cleansed as thoroughly as possible, the same as though the operation were to be performed with bare hands, the glove is picked up by the margin of the gauntlet, while the glove itself is well filled with water, when the hand is easily slid into it. The outside of the glove, especially the finger portion, should never be touched with the bare hand after the glove is sterilized. The hands with which the glove is touched should be covered with a sterilized towel.

If during an abdominal operation an abscess be encountered, the gloves should not be removed for two reasons: First, the pus may be sterile, and if this be so, the operator may with uncovered hands infect his patient, just the same as though there was no pus; second, if the pus contain micro-organisms the surgeon may himself become infected, as has occurred time and again.

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[*] From Northwestern Lancet, 20:3-4, (Jan. 1) 1900.

[†] Read before the Minnesota Valley Medical Association, December 5, 1899.

Gloves should be worn in all operations upon patients suffering from active syphilis and tuberculosis. They have been of great comfort and security to the writer a number of times in such cases, both for his own protection, as well as that of the patient, against infection with pyogenic micro-organisms. In obstetrical practice rubber gloves are of very great value. The hand that is used for making the examinations should be covered with a glove. So in obstetrical operations, such as placing the extracting forceps, or guiding the craniotomy instruments, and removing blood clots from the uterine cavity.

There are some objections to the use of gloves. First, interference with the sense of touch, which is especially true at the beginning of their use, but this in the course of time is, to a great extent, overcome; second, their use renders the technique of surgery more complicated; third, it adds to the expense. But what do such objections signify when compared with the added safety rendered the patient and the comfort of mind it gives to the surgeon in the assurance that his patient is so much less liable to infection?

Rubber gloves are, in my opinion, a real need, have come to stay, and will come into more general use as their virtues become more appreciated. I believe the time is not far distant when a surgeon who does not wear rubber gloves will be looked upon as an unsafe man and an incomplete operator.

After Treatment of Ovarian Patients[*]

A. J. Stone, M.D.
St. Paul, Minnesota

AFTER the operation for the removal of an ovarian cyst, the care and watchfulness of the operator is taxed to the utmost to avoid certain serious complications and sequences, or to relieve the same if occurring. The operation itself has been so frequently described, and in fact so frequently witnessed by nearly every educated physician, that I need not refer to it, but will confine myself to noting a few points in the after treatment of such cases which experience suggests to me, or which I have gained in conversation with some of the most successful ovariotomists in this and the old country.

After the administration of ether, which, in my estimation, is the only safe anaesthetic for this operation as yet discovered,[1] one of the most troublesome of symptoms appears, that of vomiting. Entirely reflex in its character, it can usually be prevented by the administration of a large dose of bromide of potassium upon an empty stomach, immediately before commencing to give the ether, or checked by giving one or more doses, of 40 grs. each, in free solution, immediately upon sufficient recovery to enable the patient to swallow the amount.[2] Should this agent prove unavailing, as in a very small proportion of the cases in which I have experimented with it, it has done, I would recommend with Butcher, a large dose of strong stimulant, e. g. a half a tumbler of warm brandy punch, followed by two or three drops of Scheele's hydrocyanic acid. If the vomiting should continue to an alarming extent even, I would not advise the introduction of either food nor of medicine, other than an opiate, by rectum; the disturbance thus caused is of infinite more danger than that resulting from a want of nourishment during the first 12 or 18 hours. Contrary to the advice given by nearly every operator of eminence, I would strongly advise the administration of every article of food or drink *hot*. In the eructation of gas which so often follows the operation, I would give a frequent drink of pure *hot* water. In nine cases out of ten, I believe that it will relieve the distress and check the symptom. The ordinary anti-emetics, subnitrate of bismuth, creosote, lime water, etc., are, from the character of the vomiting, in most cases unavailing. One other disagreeable symptom which we have seen follow the administration of ether, is hiccoughing, which may be relieved by a large teaspoonful of sugar allowed to dissolve slowly in the mouth, or as suggested in the *Siglo Medico*,[3] by a dose of mustard tea, (one spoonful of mustard to four ounces of boiling water).

While the operation should be made in a room heated to at least 75° Fahrenheit, yet when the operation is complete, and the patient can be covered warmly and heat applied directly to the body, the temperature of the room should at once be gradually lowered and allowed to remain at about 60° Fahrenheit until the patient is able to sit up and move around. In addition to this, the temperature of the patient should be watched and kept well up, not only for the first few hours, when the deranged and sunken condition of the patient *before the operation* would seem to demand it, but even later, until all symptoms of primary shock are overcome. I believe that in this way the reaction ordinarily consequent upon, and in proportion to, the amount of shock of depression, may be greatly modified, and is at the same time the surest prophylactic treatment of secondary shock. In several severe abdominal and pelvic operations, where I have followed the above course, the temperature during the reaction has been but slightly increased and the pulse but slightly accelerated.

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[*] From Northwest Medical and Surgical Journal, 1:117-120, (Sept.) 1870.

[1] In 1868 I saw Spencer Wells perform the operation upon a private patient, using bichloride of methyline. The anaesthesia was accomplished in about four minutes, and the operation completed in about twenty-five minutes, (a unilocular cyst), no ill results nor after vomiting appearing, but throughout the pulse was so irregular that I conceived a dread of the agent.

[2] See my article upon bromide of potassium, in the Boston Medical and Surgical Journal, of February 27, 1868.

[3] Vide August No. Ind. Journal of Med.

I can conceive of no case where the exhibition of pure oxygen, to revivify the blood and so impart tone to the nervous centers, is so absolutely demanded. I have never experimented with chloral in these cases, but shall in future administer it in preference to opium after all severe operations. Of haemorrhage, either primary or secondary, I have no fear, since the introduction of Storer's clamp shield, and the consequent compression and ligation of each separate vessel in the pedicle with silver (or plated and annealed iron) wire in cases where the pedicle can be "pocketed", "capped", or "flapped".

The great danger which looms up in the distance, even from the moment when the knife is first laid on, is erysipelatous inflammation; whether it shows itself in erysipelatous inflammation of the skin of the abdomen or in peritonitis it is to be dreaded alike. The insidiousness of the peritonitis in these cases, causes it to be especially feared, and I would urge a constant prophylactic course even when there is not the slightest symptom of the disease, especially as this course is of importance for other reasons.

(The cause of the above remark was in the death of a young woman at the Franciscan Hospital for Women, under the care of Prof. H. R. Storer and myself, then his assistant. Dr. Storer operated for the removal of an ovarian cyst, on one Sunday morning, the patient dying the following Friday, without having shown a really untoward symptom up to Thursday night, at which time, in fact, every symptom was that of speedy recovery. Friday forenoon she had a collapse, from which no amount of stimulus, used in every conceivable way, could rouse her. The autopsy, performed by Dr. Swan, revealed extensive peritoneal inflammation, and *no other cause of death.*)

From the day of operation, I would administer large doses of muriated tinct. of iron, and larger doses of pure, fresh, cool air, the latter to be gained by an elevated country site, better at least two miles from any city, a large, roomy house, and the selection of a large, high-studded room, for the occupancy of the patient—one separate from, though adjoining, the room in which the operation is performed being preferable. Should the operation be performed in the city, still greater will be the necessity for the use of free oxygen.

Directions as to the use of food are simple: crowd all the food, in its most concentrated form, and stimulus, that the patient will bear, without directly accelerating the pulse, (after reaction is established). Give no slops, and give all the food hot.

One point, to which I attribute a great part of the extraordinary success of Mr. Keith, of Edinburgh, is in the thorough education and competency of his nurses, enabling him to absent himself much from the patient, seldom seeing her more than once daily, and thus giving her no cause to find alarm and overanxiety upon his part, and inspiring confidence and consequent cheerfulness upon her part.

Should peritonitis result, after all precautions thus taken, I know of no better treatment than the old routine—the rapid exhibition of calomel and opium, and the abundant exhibition of stimulants, persisting in the same until the disease be arrested or checked. The opium can and should be administered in large, free doses, and the calomel pushed, in grain doses, until its specific effect be gently established. The tympanitis can generally be relieved by the introduction of a long tube, or by giving turpentine enemata through it. Should this fail, I should not now hesitate to puncture the abdomen with a thin exploring trochar. Hot cloths, sprinkled with turpentine, applied to the abdomen, and a thorough painting with tincture of iodine, is to be added to the above treatment.

An Address Delivered at the Third Annual Meeting of the North Dakota Medical Society, May 22, 1889*

J. D. Millspaugh, M.D.†
North Dakota

THAT a state medical society is an important institution to the profession and through it to the public, I think no intelligent physician will deny. And that such an organization will be of incalculable benefit to North Dakota, and should receive such support from the members of the profession as to insure its unqualified success seems to me also apparent.

But if these propositions are self-evident, it may not be amiss to have our attention called to a few of the more practical advantages which such an organization should aid to attain.

The objects of this association, as expressed in the constitution which we have just adopted are briefly:

1st. Association for mutual recognition and fellowship.

2nd. Union, harmony and good government, thereby promoting the interests, honor and usefulness of the profession.

3rd. The cultivation of science and literature, and,

4th. The elevation of the standard of medical education.

These four propositions when logically considered, express a great deal, but no more than it should be the aim of every society to accomplish.

It has been mentioned as an argument against the formation of a society at this time, that our numbers are few and that we are too widely separated. If my information is correct there are about one hundred graduates practising medicine in North Dakota. Certainly enough to form a good strong medical society, if they will all take an interest in it. And the fact of our separation, it seems to me, makes the demand for a society all the more imperative. I think we need not hesitate on account of numbers. I think, moreover, that I am justified in saying that the medical profession of North Dakota will compare favorably in point of general professional respectability with the medical profession in any other part of the world. The great majority of our numbers are graduates of the leading medical schools of this and other countries, and are men of broad culture and superior intelligence. I, at least, know of no other place in the United States where there are so few quacks and representatives of the various medicalisms and pathies. But as the country grows older and more wealthy these parasites are sure to come. They will secure a following, and their presence will here as elsewhere and always be detrimental to the interests of science and the welfare of the profession.

We of North Dakota are about entering upon our inheritance as a state. The prospect of a more stable and representative form of government makes the present time especially opportune for laying the cornerstone of a society that shall endure and be a power, must voice the sentiment of the profession. It must be truly representative. The first, most important thing then for us to do is to secure the interest and cooperaion of all the reputable practitioners within our limits. Then if what I have said as to the quality of the medical men of North Dakota is true, the Society will have a golden opportunity to map out and establish a policy for this state that will be beneficient for all time to come. What the profession in some of the older states have been laboring for years to imperfectly approximate, we can probably attain if we unite to that end.

It seems to me that in the first place, this Society should be chartered by the state and empowered with certain prerogatives, the more important of which are:

1st. The power of licensing all practitioners, and of granting diplomas to students of those colleges in operation within the limits of the state.

2nd. Of deciding upon the necessity or otherwise of establishing medical colleges, and

3rd. Of licensing medical experts.

That these powers are not too large nor more than justice demands is evidenced by the fact that nearly all the state medical societies in the older communities, as well as the American Medical Association and the American Academy of Medicine have declared in favor of them. But no very important enactments have been made except in a few of the states, notably Illinois and Iowa, and in these the passage of acts determining the status of practitioners is about all that has been accomplished. In a community so old as Illinois the ten year exemption clause of their present law must of necessity leave unmolested many of the most reprehensible.

We have in Dakota at the present time a commendable law upon this subject, based upon the Illinois act. But it seems to me that instead of this power being left as it now is to a Board of Health appointed by the governor, the board or whatever it may be called, ought to be enlarged, and the members of it at least nominated by the State Medical Society. Every precaution should be taken, also, to keep the appointments free from all political favoritism.

To illustrate the difficulty attending legislation of this kind in the older states, a few years ago a bill similar to the Illinois act was submitted to the legislature of Massachusetts. Several hearings were had before the committee, but such a storm of opposition was raised by the Boston quacks as to kill the bill completely before it left the committee. Several subsequent efforts to resurrect the bill have also proved failures.

In New York state the first law attempting to regulate the practice of medicine was passed in 1806, and amended during the following year. In 1813 a new law was enacted. This was again amended several times. These several acts were mere stepping-stones in themselves and of small benefit; but in 1827 a more decided victory was gained. By this law the regulation of the practice of medicine was placed in the hands of the County Medical Societies. This law was again repealed in 1842 through the efforts of the Homoeopaths, and again the state was overrun with quacks of all sorts. In 1886 another law was passed enabling the County Societies to rid their several counties of imposters, but there was a lack of unanimity between the various counties, and as a result the law soon became practically a dead letter. The State Medical Society, however, in 1880 secured the passage of a law which still remains in force. It confers the power of granting and endorsing medical diplomas upon the medical colleges of the state. This law is of great practical utility, and while in force will prevent any further inroads of non-graduates. But on account of the influence of Homoeopathy and the other pathies and the ten year exemption clause, quackery still maintains a menacing attitude in that state. A similar struggle has taken place in several of the other states with somewhat similar results.

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*From Northwestern Lancet, 9:183-185, (July 15) 1889.

†President of the Society.

These instances are cited as examples of the difficulty attending medical legislation, of the source of the opposition, and to emphasize the importance of forestalling action.

Michigan, which has initiated several medical reforms, has adopted a method for the licensing of sanitary experts by means of the State Board of Health. This is decidedly in the right line, and will facilitate other and more important legislation.

In none of the states so far as I am aware is the matter of chartering a medical college ever submitted to the profession before being acted upon by the legislature. The disgrace brought upon the American medical profession at home and abroad by the bogus medical colleges of Philadelphia and Cincinnati a few years ago, would never have occurred if the legislatures of those states had deferred to their State Medical Societies before chartering them. There is no doubt but that the medical profession has been depreciated and cheapened in this country by the unwarrantable multiplication of medical colleges. The profession as a whole ought to control this matter in North Dakota through this Society. The doubtful honor of a professor's chair ought not to be allowed to lead any of our number into error in this regard.

If it is important that the practice of medicine should be regulated, then does it follow as a corollary that the manufacture of medical men should also be regulated.

No one questions the right or propriety of the legal profession to regulate admission to its ranks. If this is important and of benefit to the public, as it no doubt is, how much more important, from the very nature of the calling and the inability of the laity to judge correctly of its members, must it be that the admission to the sacred precincts of medicine be guarded.

In my opinion there is no one thing that so tends to bring medical men and the profession as a whole into disrepute, as the farce that is so often enacted in the courts under the head of expert testimony. In some of the medical centres of the East, I believe one can pass an examination and receive a special diploma declaring him an expert in certain branches of medical knowledge, but in no state does the State Medical Society have authority in this matter.

A class of proceedings, in which expert testimony figures so prominently, and which certainly deserves some special legislation is mal-practice suits. In these cases, the great majority of which are of a purely black-mailing nature, the plaintiff should be compelled to secure the innocent defendant against all and every cost incident to the trial. As we all know, no medical man, no matter how scientific, competent and faithful, can practise medicine a month without the possibility of a suit of this kind. It is a standing reproach that a suit of this kind can be instituted out of pure malice, and the profession so impotent to prevent it.

These are some of the more tangible objects, which it seems to me this Society should have in view. The character of the profession of North Dakota at the present time is such that these objects could be sought with a degree of unanimity scarcely possible in the older settled states. If we wait till the demand for these things becomes more apparent, it may then be too late to accomplish much without great effort. The history of all legislative reforms shows that the West, the new countries have taken the lead. Here public sentiment is not yet crystalized. Everything is in the formation stage. We are all on the lookout for something better. There are no established usages. Justice rather than precedent has weight. While avoiding foolish legislation, which is ever a rope of sand, let us help to mould and crystalize this sentiment into an enduring and beneficent form.

If necessary let this Soceity have a standing committee on legislation, whose business it shall be to thoroughly investigate these matters and report its findings from year to year. Shall we not profit by the experience of the older states and countries?

It is superfluous for me to speak of the social, literary and scientific advantages of a society such as we are forming. It is enough to say that in no other way than by association in this capacity, can the mutual recognition and respect and the proper *esprit de corps* be maintained to effect those material reforms.

Gentlemen of the North Dakota Medical Society, if we have a desire to advance the interest, honor and usefulness of our noble calling, we must put our shoulders to the wheel. We must build up this Society. Put it upon such a footing that every practitioner within its jurisdiction will *seek* its fellowship. Then with unanimity of action all possible benefits will be ours.

May the time soon come when the Medical Society of North Dakota shall not only be known and honored at home, but distinguished abroad for its deeds!

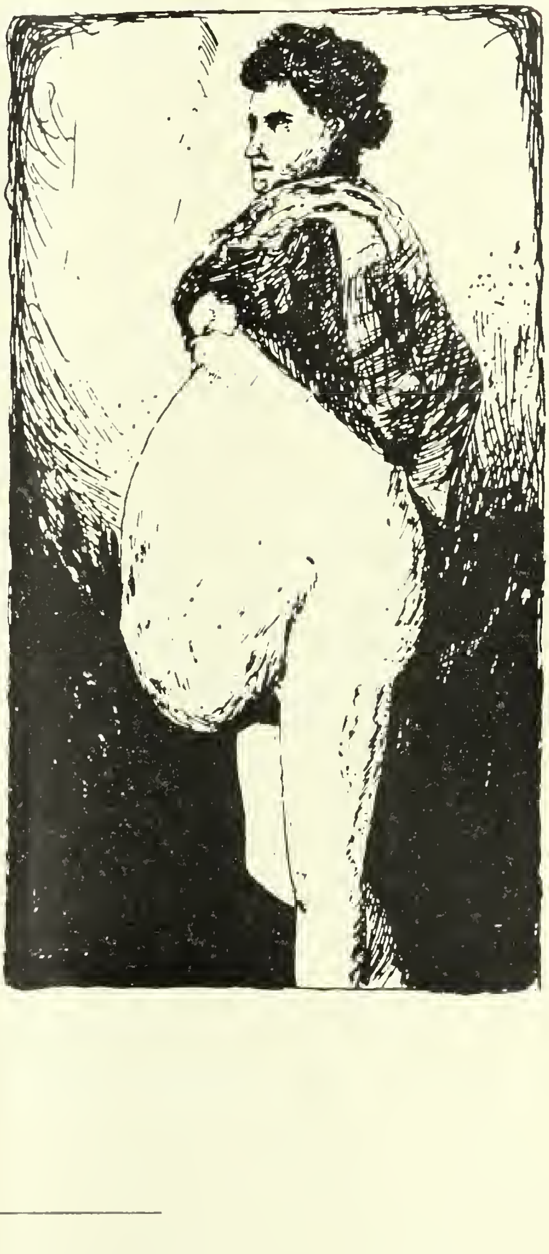
Successful Operation for Large Ventral Hernia*†

Dressing for Ulcer of the Leg

William Worrell Mayo, M.D.
W. J. Mayo, M.D.
Rochester, Minnesota

FIVE years ago we removed a thirty-two pound multilocular ovarian cyst from Miss A. Voltz, aged 17. She was an under-sized girl whose normal weight was less than one hundred pounds. The tumor involved the left ovary. In six weeks she was married, and within the year was delivered of a large boy. The weight of the pregnant womb ruptured the cicatrix, and the entire uterus anteverted into the ventral hernia thus formed between the recti muscles. Sixteen months later she was again delivered at term, leaving the hernial sack still larger and constantly filled with intestines.

In December, 1886, the left ovary became cystic and grew to enormous size, filling the abdomen and hernial sack. She was greatly emaciated and dropsical. In January last (1888) we removed a multilocular cyst through a five inch incision without special difficulty. Catgut ligatures were used on the many vascular adhesions, and braided silk for the omental stump and left broad ligaments which formed the pedicle. The tumor weighed sixty-two and a half pounds. We now removed the entire hernial sack, consisting of peritoneum skin and dropsical cellular tissue. Its size was equal to an ordinary wooden pail, and the incision laid the abdomen open from two inches above the umbilicus to the pubes. She was turned on her side and the abdomen flushed with hot water. The peritoneum and recti muscles were sutured with buried, interrupted catgut sutures. The skin was sutured separately and in a like manner. There was no discharge and the drainage tube was early removed. Her recovery was prompt and the result all that could be desired.



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*From Northwestern Lancet, 8:116-117, (April 15) 1888.

†This is the first paper by Dr. William J. Mayo and his father, Dr. William W. Mayo, to be published in any medical journal, anywhere.

Aconite Poisoning*

W. A. Jones, M.D.

Minneapolis, Minnesota

MY principal object in writing upon this subject is to report two cases, with autopsies, which recently came under my observation. Both were men, Germans, melancholy from domestic or financial troubles. In one case the drug was taken by mistake, or in ignorance of the dose; in the other, suicide was the object in view.

In the first case mentioned the patient had a half-ounce vial of what was supposed to be the mother tinct., as it was labelled from the Northwestern Homeopathic Pharmacy of Chicago.

When he was discovered, something over a drachm remained, showing that he had taken about two and one-half drachms.

The symptoms of poisoning—intense burning and pain in the throat and stomach, difficult respiration and a feeling of impending paralysis—came on in a very short time.

The man became mildly delirious, rushed about the room clutching his throat and gasping for breath, threw up his window, shouted murder one moment and begged for assistance the next.

He was so delirious that his friends thought him insane, and before medical aid could be summoned it was too late. A few moments before death spasmodic vomiting and violent purging came on. His clothing was saturated with the discharges, and as he rushed out of the door and down stairs each step was labelled with his involuntary evacuations, and as he reached the bottom stair he fell dead.

In the second case, where the intent was suicide, an empty ounce vial was found at the bedside of the patient which was said to have been full when the man was last seen alive. Death must have been sudden, as there were no evidences of a struggle.

The pupils in both cases were normal, or slightly contracted, if changed at all. Generally the pupils are dilated.

The post-mortem appearances can hardly be called characteristic of aconite poisoning, but there are a few morbid changes to be looked for, considering the action of the drug upon the vital centres in the medulla. A prominent feature is a deficiency in oxygenation, and the irritative action of the poison is another.

Autopsy No. 1.—Male, aet. 40. Five feet nine inches high. Weight, 180. General build good, adipose tissue abundant, muscular system well developed.

In cutting through the soft parts of the head a large quantity of dark blood escapes from the divided vessels. Scalp adherent throughout. After removing the calvarium the dura is found adherent along the longitudinal fissure. Separating the dura the venous blood pours out in streams. The pia is everywhere engorged with blood, the space between the large vessels uniformly red. No change in brain externally. Inner surface of lateral ventricles abnormally dry. Section shows brain pale and anaemic.

In opening the chest and abdomen a strong odor of alcohol prevails. The man, of course, was intemperate in his habits.

Lungs firmly adherent throughout, deeply pigmented, slightly tuberculous at both apices.

Heart walls flabby, the right more than the left, and is also much thinner and contains ante-mortem clots. Both ventricles filled with dark, venous blood.

Mitral and aortic valves calcareous; also calcareous deposits on inner wall of aorta.

Liver enlarged and fatty.

Gall bladder distended with bile and adherent to intestines in vicinity and also to right kidney. Both kidneys enlarged and congested.

Stomach distended, pale on outer surface and contains digested meat and about three ounces of fluid which has an alcoholic odor. The mucous membrane near and around the cardiac orifice and along the dependent part of the stomach is congested in patches about the size of a quarter. The inflammatory changes did not extend to the pyloric end, but this portion was highly corrugated.

The intestines showed no post-mortem changes.

In the second case, in which an ounce of some preparation of aconite was taken, the morbid appearances were more noticeable.

Autopsy No. 2.—Male, aet. 45. Five feet eight inches in height, muscular and fat. Anterior surface of body pale. Posterior surface spotted with hypostatic congestion. Eyes partially open, cornea opaque, pupils slightly contracted. Inner surface of mouth pale. Rigor mortis well marked. Chest full, abdomen distended.

Head.—Soft parts incised transversely and reflected. Thick, dark blood escapes freely from divided vessels. Scalp peels off like parchment, leaving dry and bloodless surface. Skull-cap presents marked orbital and parietal prominences. Temporal muscle on right side soft, flabby, and discolored. The skull-cap is very thin laterally, but of ordinary thickness anteriorly and posteriorly. Dura adherent along longitudinal fissure. Brain substance abnormally soft at base, particularly at pons. Several ounces of dark blood escape from vessels. Inferior carotid and middle cerebral arteries show signs of commencing atheroma. The pia throughout is congested highly, larger vessels fully distended. About three ounces of light fluid escape from ventricles.

Thorax and Abdomen.—Opened by long incision from chin to symphysis. Adipose tissue abundant. Muscles well developed. Intestines distended with gas.

Lungs.—Right, normal. Left, firmly bound down, diminished in size, and shows caseous pneumonia.

Pericardium very thin, fluid scanty. Heart, fatty. Vessels prominent on surface and atheromatous. No valvular changes. Walls flabby, and ventricles filled with dark blood. Liver enlarged, friable, and fatty. Capsule strips off in small pieces. Right kidney almost enclosed in adipose tissue. Section normal. Left kidney and spleen normal. Stomach somewhat distended. Outer surface pale. Contains about half pint of fluid, dark in color, and has an odor of aconite. Around the cardiac orifice for three inches are several red and brownish-red spots. Traces of congestion extend nearly to the pyloric orifice. Mucous membrane throughout is highly corrugated. In a few places the congested spots present a blistered appearance.

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*From Northwestern Lancet, 4:83-85, (December 15) 1884.

In both of these cases the important points are the dark red color of the blood, the intensely congested pia mater, the flabby heart, the congested and abnormally colored spots in the stomach with its corrugated surface.

In cases of longer standing we would expect to see the same condition, but intensified, in the duodenum, with a breaking down of the mucous coat.

The only proper test for the suspected fluid in such cases is a physiological one, as no chemical test has been devised.

In the first case I tried some of the fluid and got the burning and tingling sensation so characteristic of aconite. The only remedies to be applied in cases of poisoning by this drug are those which stimulate the heart and respiratory organs. After the contents of the stomach have been evacuated, alcohol, ammonia, ether, and hypodermic injections of digitalis should be freely administered.

Hydrochlorate of Cocaine in General Surgery*

J. Ohage, M.D.
St. Paul, Minnesota

SINCE the publication of Koller's great discovery of the anaesthetic action of cocaine, I have made use of this agent to produce local anaesthesia whenever any favorable occasion presented itself, and have been agreeably surprised at the results I obtained from its use.

The facility of its administration, the promptness and certainty of its action, and the absence of any untoward symptoms of any moment from its free exhibition, induce me to welcome it as one of the greatest discoveries and blessings to humanity.

I have used many times, and almost always successfully, a 4 per cent salicylated solution in operations upon mucous surfaces, and the results have been so flattering that it has to a great extent with me superseded the induction of general anaesthesia by chloroform or ether, and I think the limits of its use have not yet been arrived at.

The mode of its application was the following: In tonsilotomies—painting the clean surface of the tonsil with a 4 per cent solution, repeating the same after four or five minutes.

Excision of the uvula: Apply in the same way.

Evulsion of nasal and naso-pharyngeal polypi: Drop from six to ten drops into the nostril of the affected side, the head hanging low.

Excessive earache, due to a furuncle of the auditory canal: Drop six to ten drops into the affected ear, the patient lying upon the healthy side; then introduce cotton tampon. The relief will be almost immediate, lasting from four to six hours or more.

In operations of the lower part of the rectum and anus, as for fistula, fissure and haemorrhoids, simply painting the surface with a 4 per cent solution and repeating same after four or five minutes, will abolish pain sufficiently to allow any cutting or cauterization.

In operations of the cervix uteri, the introduction of a cotton pledget, saturated with a 4 per cent solution, into the cervical canal, and painting the vaginal portion with a solution of the same strength, will induce sufficient anaesthesia to allow the performance of any operation, as for lacerated cervix, for stenosis of the cervical canal, etc. For the operation of fistula, vesico-vaginal, recto-vaginal or colporrhaphy, the painting once, or if necessary, repeatedly, is sufficient, but for perineorrhaphy of great extent involving the deeper structures, I would suggest the hypodermic injection of four to eight gtt. of the 4 per cent solution as more efficient. The injection should be made below the mucous membrane of each side of the rent. One precaution is necessary: in all cases must the mucous membrane, where it is to be painted over, be thoroughly cleansed with absorbent cotton. This is especially necessary with the mucous surfaces of the uro-genital tract.

A few weeks ago I removed from the glans penis and prepuce of a young Swede at least a hundred gonorrhoeal warts (condylomata acumenata), in the presence of Dr. C. Schmidt. After thoroughly cleansing the parts and making two applications of the 4 per cent solution with a camel's-hair pencil, I removed them with the Paquelin thermo-cautery. The patient stated that there was almost no pain at all.

To show that even larger operations can be made painless by the use of cocaine, I give the two following cases:

*From Northwestern Lancet, 4:197-199, (March 15) 1885.

Mr. A. B., a Swedish minister, about 40 years of age, well built, very intelligent, but exceedingly nervous, was sent to me by my friend, Dr. F. Dedolph, of this city, to confirm a diagnosis of epithelial cancer, of four months standing, on the anterior surface of the left leg. The tumor was about the size of a small pigeon's egg, ulcerated and sensitive, the surrounding tissues involved to the distance of about one centimeter. There being no doubt in regard to the nature of the growth, its early removal was resolved upon, and I extirpated it, with the assistance of Dr. Dedolph, on the 24th of February. As I anticipated trouble from chloroform or ether, and was desirous of finding out what cocaine would do in a case like this, I injected 10 minims of a 4 per cent solution under the skin in a downward direction about three inches above the tumor. After waiting two or three minutes, I applied Esmarch's tube above the knee—the patient meanwhile lamenting, complaining of severe pain, nervousness, etc. After waiting two or three minutes more, I injected five more minims of the same strength. Still the patient was complaining, but to find out how much of it was real, I had him cover his face, and gave him a smart prick with the point of the scalpel near the tumor. He did not flinch—sensation was abolished. I then commenced the operation; extirpated the tumor, ligated a few vessels, and closed the wound with stitches. The wound was elliptical, three and one-half by two inches in its widest diameters, and extended down to the periosteum of the tibia. The antiseptics were what I always use: corrosive sublimate 1:2000 and iodoform. There was no pain during nor after the operation, nor were there any constitutional symptoms save a feeling of cheerful quietude. There were no changes of the pupils nor of the pulse. The patient himself stated that at first there was a sensation of numbness in the leg, then absolute loss of sensation, and in regard to pain he had less than when his skin on the arm was scratched for vaccinating two years ago. But he was so nervous! The operation lasted about fifteen minutes, and when I left him half an hour later he was still free from pain; in fact, none ever came, and he made an uninterrupted recovery.

The following case is of still greater interest, being an amputation of the penis for advanced carcinoma, in a man 74 years of age.

February 27th I was called to Waverly, Minnesota, to perform the operation of amputation of the penis. Patient, August Sch., aet 74. German. Had noticed a swelling upon the dorsal prepuce of his penis about eight months ago, which was properly recognized as carcinoma and excised by Drs. Shelton of Howard Lake and O'Hair of Waverly. Two months after the first operation, which was done under ether, the swelling reappeared, involved the glans penis and began to ulcerate. Instead now of seeking help from his former trustworthy attendants, he fell in with a charlatan of the worst order, who denounced his two former physicians and attempted to cure this "inflamed wart" with steaming, lunar caustic and salves. When I saw him the disease was far advanced, the inguinal glands on either side, the superficial as well as the deep being involved, the urethra compressed so that he could hardly evacuate his bladder, the pain constant and excruciating. Anything of a cure would not be looked for, but an operation was called for for two reasons, viz., to relieve the constant pain, and to restore an unobstructed outlet for the urine. With these points in view, and with the approval of the patient and his relatives, I decided to amputate. The parts having been well washed with a solution of 1:1000 corrosive sublimate, I injected 1 gramme (15 minims) of a 4 per cent solution of cocaine muriate under the skin of the penis near the roots, in a forward direction. The injections were made in three places, one on the dorsum and one on either side, 5 M. into each. I then got my instruments ready, threaded my needles, etc. Having no one to assist me, this occupied my time for about five minutes. Two minutes after the injections, I had put a constricting elastic tube around the penis. By this time there was absolute loss of sensation, and having the patient sit on the end of a table, I seated myself in front of him, a friend of his standing behind him holding an opened towel before the patient's face to prevent his looking on. I then removed the penis to within one inch of the symphisis, applied seven or eight ligatures, split the end of the urethra and fastened it sideways to the skin. The operation lasted about fifteen minutes. There was only a slight pain when I put the stitches through the urethra towards the last; of the other steps of the operation he felt absolutely nothing. After I had dusted the stump with iodoform he walked to his bed unassisted, made himself comfortable and lit his pipe, declaring that he felt better now than during the last six months. In this case also there was absence of any untoward constitutional symptoms. Before I left him, four hours after the operation, he was perfectly comfortable, free from pain, and had passed his urine without any difficulty.

I think that by the use of the constricting elastic tube, applied one or two minutes after the subcutaneous injection of cocaine, the local effects are increased and the constitutional diminished.

The only untoward constitutional effect I ever saw was in a young lady, where I applied a saturated cotton pledget to the cervix; heavy breathing and slight hallucinations set in, but lasted only for a few minutes. A cold drink of water set everything right again.

The preparation which I invariably use is Parke, Davis & Company's 4 per cent salicylated solution of cocaine. It has always given me full satisfaction, and I think is as reliable as any of their preparations.

The only objection and obstacle to a more general use of cocaine is its high price; if it were not for this, even in obstetrics I think it would play a role, and to some extent displace the general anaesthetics.

Two Cases in Practice*

W. J. Mayo, M.D.
Rochester, Minnesota

Compound Fracture of the Lower End of the Humerus with Simple Fracture of the Condyles, and Head of Radius.—Excision Resulting in Good Motion.

Willie Hall, age 10, of Rochester, Minnesota, September 10, 1886, was thrown from a horse, striking upon his left elbow, producing a simple comminuted fracture of the condyles and head of the radius, with a compound fracture of the shaft of the humerus, two inches above the articulating surface, the upper fragment of the shaft projecting through the skin, his shirt, coat sleeves and two inches beyond. Under chloroform, with the assistance of my father, Dr. W. W. Mayo, my brother, C. H. Mayo and Dr. H. Witherstine, I enlarged the external wound, which was on the outer side of the arm, and after a thorough cleansing reduced the fracture, made a counter-opening in the under side and introduced a large drainage tube. The arm was laid upon an angular copper splint with an absorbent cotton dressing. This dressing was not removed for ten days. At that time the arm and hand were found badly swollen, the upper fragment of the shaft of humerus engaged in the wound and a small amount of suppuration. General condition excellent. Various methods of retention were tried, but with the exception of the straight posture all failed on account of the position of the external wound, as any degree of angle would cause the bone to protrude. On account of the fracture in the joint, with the probability of anchylosis in an unfortunate situation, this position was impracticable.

Excision of the lower end of the humerus and head of the radius was decided upon. This was accomplished on September 24, by enlarging the external opening downward, opening the joint and carefully dissecting out the fractured bone ends. The upper fragment of the humerus was also shortened, leaving the ulna intact and the radial attachment of the biceps uninjured. The wound was thoroughly drained and the arm placed upon a straight splint with an absorbent cotton dressing; the healing was very rapid.

Result. The arm is two inches short, pronation and supination imperfect but improving. Extension and flexion two-thirds of the normal range.

Might it not produce better results in many of the T fractures of the humerus, when fixation of the joint is probable, to excise the fractured ends, being careful to remove sufficient from the humerus to prevent anchylosis and give motion to the arm?

Mastoid Abscess.—Opening Mastoid Cells

September 28, 1886. Swend Olson, age 33. Occupation, drayman. After exposure to a cold wind on September 15, was seized with pain in the right ear, for which he consulted me September 18. Upon examination I found the external auditory canal swollen and tender in its upper and posterior walls. The ear drum was pasty in appearance, and on account of the condition of the auditory canal, the examination was painful.

Fearing a repetition of this, he did not call upon me again until the 22nd. I was then called to the house to see him and found him suffering from pain, fever, chills and sweats. The condition of the parts behind the ear was obscured by the vesication of a blister I had placed there when first seen. Placing my patient in a good light I incised the right ear drum freely and a drop of pus appeared in the wound. Upon the 22nd and 23rd his condition appeared better. Upon the 24th there was a return of the fever, chills and sweats and I decided to open the mastoid cells. Chloroform was administered, the mastoid process freely exposed by incision and a small quantity of foetid pus found beneath the periosteum. The temporal bone for some distance was rough and the periosteum dissected up by this pus. With an ordinary gimlet I opened the mastoid process to a depth of three-fourths of an inch. The relief was immediate and improvement marked. On the 26th I had A. Bamber, D.D.S., enlarge the opening in the process with the dental engiene, which was done rapidly and perfectly. Introducing a small, stiff drainage tube and washing the cavity in the mastoid twice daily, much bone debris was removed, a peculiar feature being the pulsation of the fluid or pus in the tube. The improvement was gradual for about a week when signs of septic poisoning appeared, and the patient rapidly succumbed on the fifteenth day after the operation. I received much valuable assistance from Drs. W. W. Mayo, J. E. Bowers and Collins.

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*From Northwestern Lancet, 6:64-65, (Nov. 15) 1886.

Warming and Ventilation in Dakota[*][†]

S. A. Brown, M.D.

Sioux Falls, Dakota

MR. PRESIDENT: Undoubtedly we are all willing to admit at the outset the plain and salient fact, that there are few regions in the world so thickly populated as this, where the cold weather is so extreme and so lasting; that whilst our climate in all other respects is pre-eminently wholesome, in this one particular we have much to contend with; that, notwithstanding the dryness of the air, there are but few days, during several months of the year when it is wholesome to do outdoor work, and that, not on account of storms and snow, for we have more sunshiny days in winter than any other temperate region, and there is scarcely any snow, but because of the severity of the cold.

Had the climate in these vast and beautiful plains been congenial to the development of the human race in a state of nature, the few scattered and scanty tribes of savages which we found upon them would have been great and populous nations, who would have hurled back the European from these shores at every onset. By the aid of the climate we have conquered the Indian with ease; but the battle has only just begun. If we would secure health and long life with the individual gain and the added power as a commonwealth, which would follow, we must now so subjugate the climate as to obtain, in our new home, shelter, warmth, pure air and sunlight sufficient for perfect health. The intelligence of the Indian was not equal to the solution of this problem. His rude shelter and scanty fire were so inadequate to his needs, that the pitiless winter always kept his tribes meager and poor, and no real development could ever be accomplished.

The sweet air of Dakota is known and praised the world over. It has the important quality of being antiseptic, that is hostile to the germs of disease, so that notwithstanding the great length and severity of the winters, and the prevailing neglect of systematic ventilation, a person suffering with consumption will live longer here than in any other part of the world, and what is better, frequently regain his health altogether. Under proper hygienic conditions it would scarcely be possible to place a limit to the good this climate will do in such a case. But unfortunately, during the winter time, with our present methods, we contrive to secure in our homes so many elements of a hurtful climate, that all the good qualities of our invigorating and health-giving air are often more than counterbalanced, and we are so reduced during the cold weather that we begin the new year each spring with greatly diminished vitality and energy, and often bear indelible marks of the injuries inflicted upon us by the enemies which we have fostered in our houses. These enemies are vitiated air, unequal temperature and insufficient shelter. When we shall have fortified against them and have fairly conformed to sanitary teaching, we shall be able to challenge comparison with the world for health and long life.

A matter of most transcendent importance to the human race, and one whose fundamental principles and practical details should be studied by every member of the community, is sanitary architecture. It may be applied in the construction of every abode at whose door pale death can ever knock, from the smallest hut of the poorest laborer to the grandest palace of the richest king. Its neglect has proved to be the fertile cause of mourning in every land, in every walk of life.

When you wish to build a healthy house, first get a high and dry location; lay the foundations deep, so as to prevent the frost from getting beneath, to rack the walls, and make them pervious to air; when the frame is up shelter it with matched flooring, your object being to prevent air from passing through the wall. The ordinary sheathing used in building is a delusion and a snare. It offers no protection against the weather whatever; but matched flooring will keep out the air. In laying the floors carry them out between the studding and the sheathing, so that air in the walls cannot circulate up and down past any floor. Then back-plaster between the studding so as to divide the dead air space into two equal parts. The object of a dead air space is to prevent the escape of heat, and the more such space you can have between the interior of your house and the weather, the warmer you will be. Nothing more strikingly illustrates the efficiency of a dead air space in preventing the escape of heat, than the application of a storm sash to a window. A single window, even when air tight, takes out of a room four times as much heat as a double window. Carry your back-plaster through from floor to floor. If permitted to do so many plasterers will leave a foot at the top and bottom of a room, stopping at the washboard and at the ceiling, and you wonder why you get no benefit from your back-plastering. This method is worse than useless, it is positively injurious. The two air spaces in the wall communicating with each other at top and bottom, a circulation of air is set up the moment the room becomes warmer than the weather. The air in the inner space is warmed by contact with the plaster, becomes light, rises and passes over at the top into the outer space where it grows cold and heavy, falls to the bottom and pours into the inner space again. This circulation is active in exact proportion to the difference between the temperature within and that without, and it causes the loss of much more heat than would take place if the space in the wall were not divided. Back-plaster may be made more effective by pasting wrapping paper on it to prevent air from getting through. Nail on accurately fitted boards to the studding betwixt the joists, so that the spaces between the joists and those between the studding shall not communicate, otherwise a circulation from beneath the floors to the walls will make great waste of heat. For further economy the various fresh and foul air shafts should be in the partition walls.

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[*] From Northwestern Lancet, 5:244-248, (April 1) 1886.

[†] Read before the Humboldt Club, Sioux Falls, Dakota.

Wall paper is a useful agent in the economy of heat. If you will notice the upstairs ceiling plaster in many houses a year old, you will see the figures of the laths marked out in light shades whilst the spaces between are dark, showing how the air has been passing through more freely between the laths and depositing its impurities in the plaster. A good deal of heat gets away by this means. Wall paper will do much to prevent this waste; a floor above, even if only of building paper, will do the rest.

Every outside doorway must have a vestibule, a storm house or other contrivance so arranged that there will be two doors to go through on entering, the first of which can be closed before the second is opened. By this means you prevent a draft of freezing air of a hundred cubic feet per second from deluging the floor and chilling the feet and legs of the inmates. Cold air falls at once to the floor and remains there until it is warmed. Every window must have a storm sash, as it has been proven that a single window carries off four times as much heat as a double window, and twenty times as much as the same space of wall, allowing that the single window is air tight, which it so seldom is.

All this preparation to prevent the escape of heat is made because there is such an incalculable waste of heat by means of the windows, walls and ceiling, to no good purpose whatever. If I could give you an adequate idea of the extent of this useless waste, you would say that the precautions I have suggested are scarcely a tithe of what ought to be done to prevent it.

Every part of the house which is frequented by the family must be thoroughly warmed. The part of the house which cannot be warmed must be disused. In many houses the inhabited rooms are warmed, but the halls are left cold. This is a dangerous practice, and leads to much sickness. Who would allow his child to leave his energetic games in the warm summer air of a June day and rush into an ice box where the temperature is freezing and, maybe, linger there? a change of thirty-six or seven degrees.

Whilst you must have in every part of your house "at will the temperature most congenial to the human constitution," you must also have "air as free as blows on the mountain top." Fresh air in abundant and constant supply is absolutely essential to the preservation of health, whether the individual be within doors or without. You may go into a room and find the air perfectly pure, but if you remain and no renewal of air is made, you cause by your breathing and perspiration the vitiation of at least two thousand cubic feet of air each hour, until the whole is rendered unfit for breathing. Every action of the human system, however involuntary or apparently insignificant, consumes a portion of the structure concerned in the act. When you take a breath, a number of cells in the chest is destroyed; when you raise the hand, cells in the muscles of the arm are used up; each thought causes the death of cells in the brain. Even when we are asleep a multitude of operations are proceeding in all parts of the body. The heart, the lungs, the liver, the kidneys, all sorts of glands and follicles are busily engaged in the performance of their functions whilst the mind is unconscious, and each act or effort causes the disintegration of part of the cells which compose the organ so acting. The moment a cell in the body is dead it becomes poisonous, and, if permitted to remain, causes injury to the tissue in which it is situated. The beautiful mechanism of the system instantly acts upon the dead cell and takes it into the blood, which carries it to the various portals of the body, each of which removes a portion until the whole is cast out. A vast amount of this noxious matter is eliminated by the lungs and skin, and immediately passes into the surrounding air. These poisonous exhalations are still injurious after they have passed out of the body, and if permitted to accumulate so as to reach a certain degree of concentration, cause immediate death to the person who breathes the air containing them.

When, for any reason, the lungs are unable to cleanse the blood of its impurities, the skin immediately assumes a portion of their labor in addition to its own, and becomes extremely active, so that when the air becomes greatly vitiated so as to hamper the lungs, a copious perspiration breaks out, and much impurity is thus eliminated; but when a person, by sleeping in an unventilated room is brought into this state of perspiration during the night, he is thereby rendered unfit to go out into a cold atmosphere in the morning. The importance of the function of the skin in this respect has been amply shown by a host of experiments.

"Air," says Col. Waring, "is like a rope—you can pull it better than you can push it." All appliances intended to push air into a room or space to be ventilated have been disappointing. What we need to do is to pull out the vitiated air already in the room; the fresh supply will take care of itself if means for its admission are provided. By constructing a foul air shaft from a register near the floor in each room, and connecting it with a ventilating flue built in the chimney, we get from the smoke and air which arises from the fires, all the heat required to operate it successfully. Movement of air for this purpose is always best and most economically secured by heating it. Air in an inhabited room is always sufficiently warm during cold weather to mount a flue without the aid of heat, but its movement is accelerated by heat applied to the flue. A gas jet burning in the bottom of a shaft connected with a cold room will cause the ascension of 1,000 cubic feet of air to each cubic foot of gas consumed.

Ample means must now be provided for the admission of warmed fresh air to supply the place of the vitiated air which has been drawn from the room, but one of the most difficult feats to accomplish in connection with this subject is to convince people who have come here from milder climates, and who hold sound views on the subject of ventilation as applicable in the places they have left, that warm air and fresh air may be the same thing. Well educated and intelligent people who will listen to you with the utmost politeness, and even concede all you claim, are entirely incapable of realizing that any air may be pure and fresh which does not come in freezing cold through the window or door. They are sure that a room can only be aired properly by opening the windows and doors and introducing a draft of cold out-door air. This is a dangerous mistake to foster in this climate.

We all know how dangerous to health a climate is where sudden and extreme changes of temperature are apt to occur; but do we realize that if we open the doors and windows of an inhabited room when the mercury without stands below zero, and let in a draft of air at that temperature, we produce a more sudden, violent and extreme change than ever takes place in the weather at any season in any part of the world? Many persons have told me that they open the windows and doors every morning and air the rooms thoroughly. Such ventilation amounts to nothing. It is a good thing to air bedding in this way, but the human system requires a constant supply of fresh air, day and night. Suppose that your house contains ten thousand cubic feet of air, and there are five in the family; in one hour from the time the windows and doors are closed the whole is rendered impure, each person spoiling two thousand feet per hour.

The fresh air must be warmed before it enters the room. This cannot be done if a base burner is used for warming. Of all the appliances used for warming houses, this popular fuel-economizing stove is the least in harmony with the principles of sanitary heating. It withdraws no air from the room except just what is required for the combustion of the fuel consumed, so that any effectual ventilation must be secured entirely independently of the heating apparatus. In addition to this, the base burner is at present constructed with so many doors and windows, that one considers himself fortunate if, through some opening, the poisonous gases which are generated so freely in the combustion of anthracite coal do not escape and poison his family. How often it is that the physician is called in the night to a family, several of whose members are insensible from suffocation with these gases.

The *ordinary open fire* has great advantages as a ventilator, and is particularly desirable in a mild climate, because it produces a strong upward current, removing from six to ten thousand feet of air per hour when the chimney throat is large, but this air must be replaced by cold air from without. It is very extravagant of fuel, only one-eighth of the heat which it produces being utilized.

Heating by steam is usually done by means of radiators, generally in the form of coils of pipe placed in the rooms. Applied in this way it is better than the base burner, in that it produces no gas with which to poison the family. Any ventilation which is obtained is entirely independent of the heating apparatus. Any fresh air which is obtained comes in cold from without. Many persons believe that air heated by steam is not so dry as that from a furnace. This comes from a misapprehension of the facts.

Heating by hot water circulating in pipes is extremely valuable where a steady and sustained temperature is desired, especially in hot-houses and conservatories. Water has a great capacity for heat. The heat required to raise the temperature of one cubic foot of water one degree is sufficient to raise 2,850 cubic feet of air one degree. For warming houses it is open to the same objection as the steam. Both of these methods are excellent, and fulfill every sanitary requirement when the heat is applied by means of hot air chambers, that is, the fresh cold air is conducted from the outside into a box containing the steam or hot water pipes, and by circulating amongst them is heated before passing into the room intended to be warmed.

The *hot air* furnace seems to fulfill most of the requirements of a heating apparatus for this country. It heats and ventilates a house evenly, successfully and economically. It has the delightful quality that it will send no warmth to any part of the house where the ventilator is closed. To warm the house successfully you are obliged to have ventilation sufficient for the inmates.

To my mind the best method of heating is the floor-warming system. In this the air is warmed in a hot air furnace and conducted to the spaces between the sleepers or joists under the floor, and, after circulating through all the spaces beneath the floor, is admitted through a register, being withdrawn from the room by a foul air shaft when it has been used. By this means we have the floor warmed, so that the feet are never allowed to suffer from cold. In all other methods the floor is the coldest part of the room, but in this it is the warmest, an advantage which appeals to the common sense of everyone. If your feet are warm you can endure a much lower temperature for the rest of the body than you otherwise could.

We will heat the house, therefore, with a furnace. In ordering a furnace be sure and get it big enough. Measure the cubic air space which requires to be warmed, and then buy a furnace of two or three times the normal capacity required. If you have 15,000 cubic feet of air space, get a furnace warranted to heat from thirty to forty thousand. It will then last a much greater length of time, and you will be able to warm the necessary amount of air.

Air suddenly heated is always unwholesomely dry. This is an important point in regard to the subject of warming and requires earnest consideration. A cubic foot of air at zero can contain almost one-fifth of a grain of moisture, but if heated to 80 degrees it can contain sixty times as much, and thus has become thirsty and drinks moisture from everything that contains it. Wherever the temperature within doors is much higher than without, the air is in a too thirsty state and parches the skin and lungs, unless means be taken to supply the necessary moisture. *An evaporating pan or other contrivance for supplying moisture to the thirsty air is an essential part of every warming apparatus.* The furnace is invariably fitted with a large evaporating pan, which is entirely adequate to the needs of the heated air. The steam apparatus which is being put in here is furnished with a small jet, whereby steam is diffused into the room and produces a delightful feeling in the air.

Where shall we get the air which is to be heated in the furnace for the rooms? After what has been said you would think that there is no other place than outdoors from which people draw their supply, but such is not the case. A device has been resorted to by parties seeking to heat a house at a nominal cost, by which the air is "revolved", and the whole charm and value of the furnace from a sanitary standpoint is destroyed. This saves heat, but it wastes health. Another reprehensible source of supply is the cellar, the air of which is apt to be impure, and is supplemented often by that from the kitchen and pantry. The only proper source of air for this purpose is out-doors.

The ground freezes in this region to a depth not exceeding five or six feet, depending on the severity and length of the winter. Below the frost line the temperature of the earth is at all times above the freezing point, whilst the air above ground is sometimes seventy degrees lower. Now the simple deduction from this fact is, that if you make an underground channel deep enough and long enough, and pass air through it, the air will issue from the channel at a temperature above the freezing point, whatever its temperature may have been before entering.

With this underground channel connected with your furnace you do not require a cowl to force the air in. By exhausting the used air from the house and the heat of the furnace, a sufficiently active movement will be produced to supply all the fresh air needed. This air will reach the furnace from thirty to seventy degrees warmer than the outside air, and, as in a properly built house it is rarely necessary that the air coming from the furnace shall have a temperature much above one hundred degrees, you save from one-third to one-half of your fuel during the coldest weather. By connecting this underground channel with a ventilating grate or a jacketed stove, this system may be applied to the smallest house, and thus procure systematic ventilation at a cost not exceeding what is now spent for heating without ventilation, whilst great economy in health and vigor is secured.

Mr. Moore lays great stress on the comfort gained by the use of this system in summer. He keeps his house pleasantly cool through the hottest weather, as the system furnishes air at 50 degrees during that time.

The house is now finished. It is situated high and dry, its foundations are deep, it is sheathed with matched flooring and back-plastered. There are double dead air spaces in the walls, and there is no circulation of air in the walls nor under the floors; the rooms are papered, foul air shafts are provided, heat is produced by a furnace so large that none of the air is ever burnt; an evaporating pan is kept full of water to moisten the air, which is delivered to the furnace with the chill taken off by an underground channel, and the house is warmed wherever it is used.

In every part of the dwelling can be had at will the temperature most congenial to the human constitution and air as pure as blows on the mountain top. The inmate of such a house is hale and strong—his sleep is restful, his appetite good, his digestion vigorous, his skin is quiet, his nerves are set, all the manifold elements of his organism are harmoniously united to resist the attack of every enemy to health which may be encountered. His head is clear, his judgment sound, he feels and is a man.

SUN BATHS*

We are pleased to see that the profession is beginning to appreciate the great part which the sunbeam performs, in the economy of animal, as well as vegetable life, and now, it is not at all unusual to hear of patients being regularly subjected to sun baths for the purpose of restoring the victims of etiolation, so commonly found amongst house-livers in large towns and cities. Attention had already been directed to the subject, when Kilpatrick's blue glass craze broke out, and disgusted the profession with the folly and credulity of the public, and the whole matter of sunbeam treatment was abandoned.

Now, however, when the epidemic blue glass nonsense has gone the way of all similar fashionable follies, there is some prospect of reviving the rational treatment of anaemic conditions by the sun-bath, and numerous physicians are availing themselves of that potent factor in the treatment anaemia, in conjunction with rational diet and haematics. We all meet with cases where anaemia fails to respond to diet and haematics alone, because the patient is excluded from the direct rays of the sun, and hence, haematosis is imperfect, and the blood refuses to multiply its red corpuscles, just as a stock of celery refuses to become green, when excluded from sunlight, or the inner leaves of a cabbage become etiolated for the same reason. In this respect, men, women and children are but human cabbages, and if shut out from the influence of the sun, our common source of life, become etiolated or blanched, and no amount of nutriment avails to give vigor and healthy vitality in the absence of the sun ray. Our artificial modes of living, especially in towns and cities, condemn our women and children to an indoor life, and to a more or less exclusion from exposure to the sun's rays, and hence, we find by far the larger portion of our anaemic patients belong to those classes, and it is to these that the sun-bath should become an inestimable blessing. Let the anaemic lady's couch, or the child's crib, be wheeled to the window, where in a state of perfect nudity, with the head only in the shade, the sun can blaze in, and thoroughly tan the hide into good healthy tawniness, when it will absorb the sun's rays, and will rubify the blood that has hitherto refused to redden up under long continued courses of iron, quinine, and nitrogenized aliments.

*Editorial from Northwestern Lancet, September 1, 1882.

Antipyrin*†

A. W. Abbott, M.D.
Minneapolis, Minnesota

ANTIPYRIN was discovered by Dr. Know of Munich. It is a coal tar product and said to be a dimethyloxy-quinine or chinzine chloride, in the form of a yellowish-white, crystalline powder about three times heavier than quinine. Under a power of 250 diameters the powder is seen to consist of crystalline masses made up of thin super-imposed plates, usually four-sided with rounded corners, and having between them very small crystalline bodies made up in the same way, giving to the whole a very unique appearance. The small interposed bodies looking very much like small starch granules. When dissolved in water and allowed to re-crystallize on the slide it spreads out in thin feathery masses, which show at their edges the same inclination to the superimposition of thin plates. On the application of heat the powder melts, and then evaporates without change of color and without perceptible odor. It has a slightly bitter pungent taste very similar to that of horseradish.

The color of the powder is said to darken on long exposure to light. It is a neutral salt, changing neither red or blue litimus. It is soluble in two parts cold and one-half part hot water, from which it will not crystallize on cooling. It is also very soluble in chloroform, less so in alcohol and still less in sulphuric ether. It is soluble in nitric, hydrochloric, sulphuric and acetic acid without change of color; carbolic acid throws down a white, silky deposit from an aqueous solution; the alkalies also cause precipitation from solution.

The common tincture of iron sesqui-chloride turns antipyrin a deep scarlet-red. This test is so delicate that if one grain of antipyrin be dissolved in four ounces of water, making a solution of 1 part in 2,000 nearly, the reaction takes place perfectly. Making the solution with urine instead of pure water does not materially interfere with the test. If, however, the test be made with urine passed after the ingestion of antipyrin, there is a material difference in the result, namely, the color while a deeper red is at the same time transparent, which shows that the antipyrin is not eliminated by the kidneys as such, but has undergone some change in its passage through the body. The best way of making the iron test in urine is to drop it very slowly and carefully upon the top of the urine in a full test-tube. If antipyrin be present a red tinge will appear upon the greyish cloud which first forms upon the urine. If no antipyrin or its product be present in the iron, only the grey cloud will appear.

It has been stated that nitrous acid produces a green in a solution not stronger than one part in 10,000, but we have been unable to verify this in a solution weaker than one part in 2,000 and then not if a small amount of urine be present. A convenient method for making this test is to add a few drops of amyl nitrite to a solution of antipyrin, and after shaking thoroughly to add a drop or two of hydrochloric acid. This liberates the nitrous acid of the amyl nitrite and a beautiful green is produced. After standing for 12 hours the green separates as a thin scum and the residuum changes to a muddy brown. As has been said a small amount of urine interferes with this test, so that it is of course useless in urinary analysis. The urine seems to prevent the decomposition of the amyl nitrite. In making this test it should be borne in mind that the fumes of the amyl even if diluted by the air of a small room may produce very unpleasant effects on the experimenter.

It has also been stated that potassium chlorate produces a yellow deposit in a solution of antipyrin. We have been unable to verify this but have found that nascent chlorine will produce a turbid yellowish-brown precipitate. This test may be made in the following manner: Put a little of Labarraque's solution into a test-tube and pour down upon it a solution of the antipyrin. The latter solution will then float upon the hypochlorate solution. Disengage the chlorine by heat or nitric acid. As it amasses in gaseous bubbles it comes in contact with the antipyrin solution and a yellowish deposit is thrown down, which changes to a yellowish-brown.

Antipyrin has the faculty of bleaching an acid solution of permanganate of potash. This test may be made in the following manner: Take two grains of pot. permang., mix with water (1 fluidounce), add a few drops of a 1 per cent solution of antipyrin and the color remains; add two or three drops of nitric acid and the color disappears. If the nitric acid is first added, the color will not change until the antipyrin solution is mixed with it. As urine has the same effect as the antipyrin in this test, it is useless as a test in urinary analysis.

The presence of antipyrin, or the product of it that is eliminated by the kidneys does not interfere with the cupric oxide sugar test, so that it need not be taken into consideration in diabetic urine.

Prof. Demme of Berne has investigated the physiological actions of the drug, and finds that 5 grains given to frogs and 20 grains to rabbits produced speedy death from paralysis. With smaller but frequently repeated doses there occurs excitability of the brain and spinal cord and vaso-motor centres, as shown by tetanic muscular spasm and increased arterial pressure. If these doses were continued there occurred loss of reflex excitability and a diminished blood-pressure, notwithstanding the heart remains active. This is borne out by the observations we have made that the pulse seems to have good volume and the spirits of the patient cheerful, even when there is an apparent collapse, i. e., profuse sweating with temperature below normal.

Another physiological effect is the change of color of the urine, which we have found constant in those who have taken antipyrin a few hours before. It is a transparent, bright red, much like that produced by adding a very small amount of blood to the urine. There is no blood, however, in such urine, nor is there albumen. Reduction of temperature below the normal is another physiological symptom and is usually accompanied by free diaphoresis.

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*From Northwestern Lancet, 5:1-5, (October 1) 1885.

†Read before the Hennepin County Medical Society.

Filehue of Erlangen first used antipyrin to reduce fever. He found that doses of 30 grains, sometimes needing repetition, would reduce the temperature in an adult from 104° F. to 100.4° F. without unpleasant results, and that the reduction took place gradually in two or three hours and usually lasted from seven to nine hours; also that the slowing of the pulse followed the decline of the temperature. A great number of subsequent observations substantiate Filehue's statement, and it can now be positively asserted that antipyrin in sufficient doses will under all circumstances, if absorbed, rapidly reduce an abnormally high temperature, without disadvantage and generally without unpleasant symptoms. It will not only invariably reduce a high temperature but will indirectly relieve all those very disagreeable and dangerous symptoms which are the direct result of the pyrexia. We say the direct result of the increased heat and not of the intrinsic poison of the disease, because, while antipyrin has not been found to cure or shorten the natural limit of any disease, it will relieve the unpleasant symptoms which are present when the fever is high and absent when the normal temperature is reached, and which will return when the fever returns and in proportion to the fever, no matter if the temperature has been in abeyance for a long time. Antipyrin may then safely be classed with those remedies which invariably act in a certain definite way. It can always be depended upon to reduce the fever symptoms. Opium, quinine, the cathartics, iodine, mercury and arsenic are if anything less certain in their proper respective spheres of action than antipyrin. While this is fortunately true, it is as true unfortunately that antipyrin is simply a reducer of temperature, and in no sense a bacillicide, and that while it mitigates it cannot be expected to shorten or cure any disease. It is fair to presume that the immense relief and comfort afforded by this remedy as well as the prevention of rapid diseases destructive by high heat, will lessen to some extent the mortality in diseases when it is applicable. To what extent this is true must be determined by future statistics.

Its range of usefulness is wide. It may be said to be applicable to all diseases wherein fever is a symptom. Diphtheria is the only disease of this class in which it has been suggested that it was inapplicable on account of the cardiac depression incident to the disease.

Its effect in the typhoid form is brilliant. Let us call to our minds a picture of which we have all unfortunately seen too many copies. A young man 20 years of age, who has been sick ten days, is lying on a disordered cot before us, his pillow stained with blood from his nose and liquids which have been spilled in his uncertain attempts at drinking. He cannot keep his sordes-covered teeth protected by his thin lips, and long grooves are beginning to show between the tendons. He tries in vain to wet his dry lips with his dryer tongue, his skin burns the hand that feels the twitching of the tendons beneath, he moans unconsciously and mutters something in his delirium which we cannot understand. We turn down the bedding and place our hands upon a distended abdomen, while the well recognized odor tells of involuntary discharges. We put the thermometer in the axilla; it registers 104 4-5° and we count a pulse of 122 and weak. How many times have you stood disheartened before such a picture? But now we turn to the mother, who stands beside the bed and who has taken many a look at this sorrowful picture, but sees in it even sadder colors than we. We comfort her by saying: "Madame, while we cannot tell what the outcome will be, we can assure you positively that in three hours your son will know you, his skin will not burn your hand, he will talk to you rationally, with moist lips, and then perhaps fall into a quiet slumber." This is no fancy sketch; the second picture is as true as the first.

If given during the pyrexia of the chill of ague the sweating will immediately follow the temperature defervescence and quinine can be immediately given. In puerperal septicaemia it will hold fast the strength that is already started on its rapid flight. In the fever of indigestion or cold of children, the mother will thank you for the rest it brings to her as well as to the child. In scarlet fever it anticipates the result of continued high body heat. In sunstroke it does as well for the sudden intense heat. In pneumonia and bronchitis it answers as well.

With small doses you may forestall the afternoon flush of the consumptive, and in surgical fever you can leave your patient with only his pain and weakness to combat.

While no hitherto known remedy approaches this as a reducer of temperature it is yet not the ideal antipyretic. The bulk is too great, it tastes badly, it sometimes nauseates and less often brings out a very amazing eruption almost identical with that of measles, papular, crescentic, and darker than the surrounding skin. That a careless administration might be followed by collapse is unquestioned, but this danger may be always avoided by beginning with the minimum dose. It does not seem to affect or be affected by other remedies given at the same time. It should be remembered, that there is a difference in the susceptibility of persons of the same age to its effects. Ten grains will begin the reduction of fever with sweating in 15 minutes with some, while others will require 20, 30 or 40 grains. In phthisis the dose needed is always small. A larger dose is generally required for a rising temperature than during defervescence. Children may be given doses in grains equal to the years of age. We have found it necessary to increase the dose to get the same effect after long continuance in one case only. When the eruption appears the fever is more easily controlled afterward. Doses may be repeated every two hours if the temperature does not begin to fall.

It may be administered by the mouth, hypodermically or by the rectum. For the two latter the aqueous solution is the most ready and desirable way of preparation. By the mouth we may use it in compressed tablets,

AUG 3
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wafers, dissolved in water or freshly in wine, and to children in syrup of tolu. One-half doses will usually answer hypodermically as in sunstroke or during delirium, while double doses may be required by the rectum. One objection to the administration by the mouth in solution is that it often produces a very persistent dryness of the throat. The rectum should be used immediately if nausea comes on.

One advantage of the remedy is that after a few visits to a family of ordinary intelligence you can leave the control of the temperature safely to them. A little effort will enable you to make any one understand the details of the manner of using, reading and washing a thermometer and of keeping a record of temperature and medicine given. Then by ordering a certain number of grains when the temperature reaches a certain point, there is no danger of mistake, and the attendants will not only have something to do but will take pleasure in furnishing you with a very intelligent record of the case, and the Doctor and the patient be saved at least one visit a day.

We would suggest the use of antipyrin as a diaphoretic as well as antipyretic in acute desquamative nephritis.

It is to be hoped that the clinics of the near future will find for us a safe and delicious antipyretic, diminutive in bulk and free from all ill effects and proprietary stamps.

I am indebted to the paper of Drs. Dupen and Butte in the *New York Medical Journal* for facts in relation to the history of the drug.

Antiseptic Surgery at the New York Hospital[*]

Edward C. Spencer, M.D.

St. Paul, Minnesota

THE generally accepted principles of antiseptic surgery have not materially changed since the time when Listerism was first practiced. The conditions of success and the conditions of failure are the same now as then. Cleanliness, perfect apposition and pressure together of wounded surfaces, drainage and rest, still form the groundwork of our creed. Lack of attention to the first point is the most frequent cause of failure. To have a clean wound we must clear away from it all irritating bodies, bacteria, and surgical dirt before and during the operation, and afterwards we must keep them away until the repair is complete. With this view, let us make the skin surrounding the wound clean with plain soap and water, and lest bacteria still remain, let us kill them or inhibit their activity with some germacide lotion. Let all hands coming in contact with the wound, all instruments, ligatures and tubes, be treated in the same manner. If there be any suppurating tissues, let every part be thoroughly scraped and washed, and let the washing be continued until the dressing is applied. Let the dressing, itself antiseptic, previously made surgically clean and prepared by surgically-clean hands, be then applied so that the wound may be permanently protected, and we have done our duty by the first point. By attention to the second, we bring together larger areas of wounded surfaces, giving greater opportunities for union, and diminishing to a minimum all cavities where blood and serum may collect. By the third, we drain away all such collections when they do occur, and prevent all tension and separation of apposed surfaces. And lastly, we rest and let the patient rest and the wound rest, and give nature every chance to do the best she can.

But though the principles have not changed, the methods of applying them have, and Listerism as once taught is now practically dead. Two and a half years ago his method was followed out to the letter, at the New York Hospital. The results were good, but there were certain drawbacks. The carbolic acid caused an excessive serous discharge, rendering frequent dressings imperative. It was disagreeable to the operator, not infrequently poisoned the patient, and quickly evaporated from the gauze dressings. The mackintosh acted too much like a poultice. The carbolized oil catgut ligatures were stiff and hard to tie, and often loosened. Moreover, carbolized oil was proven to be frequently alive with bacteria. Then chromicized sulphurous acid ligatures were used, but they caused abscesses frequently and would not be absorbed. The spray was an unmitigated nuisance, the bete noir of the poor junior, doing more harm than good.

Gradually the old materials and methods were discarded and new ones took their place. Instead of carbolic acid came the sublimate solution, carbolic acid being still used for the instruments. The customary strength is 1:1000, though once a 1:100 solution was used by mistake in a large wound and primary union followed. No symptoms of mercurial poisoning have ever occurred, though abscesses, joints, and the pleural cavity have been frequently washed out with the 1:1000 solution and the puerperal cavity with 1:5000. A solution of boric and salicylic acid is also used for irrigating wounds during the operation, as it has no bad effect on the instruments. A solution of turpentine in alcohol (1:16) is used for washing the skin before an operation. It is a potent antiseptic, penetrates more deeply than watery solutions, and combines with and washes away all fatty matters. Iodoform is very generally used in lacerated wounds, in the accident service, and small quantities are placed over the lines of incision in operative wounds. I never saw but one case of poisoning, the symptoms of which ceased when the cause was removed, and that was in a very extensive lacerated wound where the quantity used was much beyond the danger limit, 45 grains. The ligatures were formerly made by immersing the catgut in a 1:100 solution of bichloride for twenty-four hours and then keeping them in absolute alcohol. These were too stiff. Much better ones are made by soaking the catgut for twenty-four hours in oil of juniper and then keeping them in alcohol. These are strong and pliable, and any artery may be ligatured with them without danger of secondary hemorrhage. The drainage-tubes are of black rubber, kept in a 1:20 carbolic solution, or decalcified bone kept in alcohol, or alcohol and glycerine. Drains of spun glass or horse-hair, which act by capillarity, are very good in some cases, especially large scalp-wounds.

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[*] From Northwestern Lancet, 4:50-53, (November 15) 1884.

The materials used for dressings are gauze, jute, wood-wool, moss, sawdust; absorbent cotton, and peat. The gauze is a mull or cheese-cloth, freed from sizing by being washed in a soda or potash solution, and made antiseptic by immersing in a bichloride solution and dyeing. Complete dyeing is retarded by adding glycerine to the solution, and some common salt is also added to prevent the change of the sublimate into calomel. The small quantity of the iodoform gauze used is made by rubbing the powdered iodoform into the old carbolized gauze. The other materials are prepared by moistening with a bichloride solution and exposing to the air till nearly dry. The absorbent cotton comes in large layers about one and a half inches thick, between two thicknesses of gauze, which may be easily cut into any desired shapes.

The sawdust, peat, etc., are enclosed in small bags of various shapes and sizes, and about an inch thick, and are packed about the wound, thus exerting pressure where necessary and soaking up and keeping sweet the discharges. The jute and cotton make a soft and comfortable dressing of considerable elasticity and of some absorptive power, although the power of absorbing a purulent discharge is almost nil. Wood-wool and sawdust absorb rather better, but cannot take up pus at all well. With all of these substances a purulent discharge will work its way along the skin and make its appearance at the edge of the dressing some distance from its point of origin, rather than soak directly through. Peat or turf mould is the most generally useful material. There are two varieties: the light, which contains more woody matter, and is the more elastic of the two; and the dark, which is of a finer grain, is more carbonaceous, and has greater antiseptic properties. They are generally used in combination, three of the light to one of the dark. This dressing will take up a very profuse discharge and keep it sweet until it passes away by evaporation, and even when applied to suppurating wounds will absorb the pus and prevent decomposition. When the dressing is removed from a large wound, such as that made in removal of the breast and axillary glands, the peat bags are frequently found perfectly dry, nothing remaining in them but the inspissated residuum of the discharge.

To understand how this dressing is used, let us consider a simple case, an amputation of the thigh. The neighboring parts have been previously shaved, thoroughly scrubbed with soap and hot water with a nail-brush, and then washed with the turpentine and alcohol. If possible, this washing has been repeated several times. The hands of everybody assisting are treated in the same way. The instruments are in a 1:20 carbolic solution, or else have been previously boiled and are immersed in simple water. The dressing is tied up by itself, just enough to dress the wound, and no more. The sponges have never been used before, and have just been soaking in a 1:20 carbolic solution. During the operation they are washed and wrung out in an antiseptic fluid. The Esmarch is applied, the limb again washed, wet towels wound around the thigh and leg, and during the operation the wound is irrigated with an antiseptic wash. All visible arteries are tied with the juniper catgut, the bandage is removed, and all bleeding points tied, twisted, or compressed. The divided ends of the muscles are brought closely together with catgut sutures, bone drainage-tubes are introduced, and the flaps approximated with deep wire and superficial catgut sutures. A snug temporary dressing of peat bags is then applied. The next morning (18 hours afterward) this will be soaked with blood and serum. It is removed, the face of the stump dusted with iodoform, a little crumpled iodoform gauze placed about the mouths of the drainage-tubes, peat bags are placed where they will give firm and equal pressure held with a snug gauze bandage. Over this is placed a dressing of absorbent cotton reaching to the groin, held with a tight roller and a few turns of a starch or plaster bandage. This dressing will stay on for eight or ten days when the wound will be healed. In the last three cases of amputation of the thigh which I saw treated in this way repair took place without suppuration and no temperature above 99 degrees. If you care to spend time in stopping all oozing at the time of operation there is no reason why the wound should not unite under the one permanent dressing, but the method followed is probably less tiresome.

Does this trouble pay? In the summer of 1882 the attending surgeon thought not. Before fall the wards were full of cellulitis and erysipelas. Matters grew worse and worse and no one could say whether the most trifling accidental or operative wound would do well or ill. But few capital operations were performed, and those with fear and misgiving. Finally he refused to operate at all and even took some of his cases to other hospitals. A new man came on duty who thought it did pay. He paid the closest attention to every matter of detail. He was a strict disciplinarian, he explained the principles he believed, and how they were to be put in practice. And woe betide us if they were not carried out to the letter. We thought him an enthusiast and even a fanatic but as the old cases of cellulitis and erysipelas recovered or died, no new ones appeared in their stead. Quinine, and lead and opium wash fell into disuse and the house surgeon's occupation of making counter openings and squeezing out "laudable pus" was gone. During a stay of eighteen months I never saw a case of erysipelas or pyaemia develop from an operative wound.

A Plea for More Frequent and More Careful Examination of the Urine*†

S. M. Stocker, M.D.

Duluth, Minnesota

A RECENT writer says: "Bright's disease is being continually prevented by our more systematic examinations of the urine. Not only is this true for organic disease of the kidney, but it is largely so for the arrest of that most serious constitutional disturbance, diabetes, or for averting its worst consequences."

This quotation from a little work recently published in England[1] forms a fitting introduction to some remarks on the importance of frequently and carefully examining the urine of patients coming under our care.

As propositions that cannot well be disputed your essayist states:

First: That in a given case the practitioner is better prepared to give a prognosis and to lay down and to follow the proper course, if he knows the condition of the urinary organs.

Second: That in many cases the practitioner who is ignorant of the conditions of these organs, is liable to treat the patient quite as much to his detriment as to his benefit.

These propositions need no demonstration to the practitioner who remembers his physiology. There is no danger that future advances in physiology and pathology will affect their truth; hence in the future they will be deemed even more important as principles of action than they are in the present.

There is but one way to learn the condition of the urinary organs, and that is to examine the urinary secretion.

The intelligent and progressive practitioner knows so well the importance of such examinations, that it would seem that no necessity exists for more words on the subject. It is a fact, however, that many physicians examine urine only when something in the symptomatology of the cases falling under their observation leads to the suspicion of kidney implication; whence it follows that calling attention to the importance of the procedure in all grave or obscure cases cannot be untimely or unnecessary, at least until such time as the habit of the profession in this matter is changed. Constant repetition is a factor in the educational process, and in this connection may prove of inestimable value, if it lead the physician to the reflection that in a given case the result might have been otherwise, or would certainly have been less unexpected, had the condition of the kidneys been known.

The unfavorable influence of kidney lesions on the mortality of operations of magnitude is well known. Nevertheless not all teachers of surgery dwell in their lectures at any length on the importance of examining the urine prior to operating, and considering the multiplicity of our medical colleges of great, of little and of no repute, it is safe to say that not all make them.

Albumen, however, is not the only abnormal constituent of the urine to offer a doubtful prognostic in cases calling for surgical measures. Sugar also gives a warning of doubtful termination. But the prognostic significance of glycosuria has a place in the didactic teaching of surgery even less prominent than that of albuminuria. In response it may be said that the depressing influence of glycosuria on those subjected to surgical operations is still a matter *sub judice*. Macnamara,[2] an oculist of repute, speaking of diabetic subjects of cataract, says it is a mistake "to suppose such persons do not frequently make good recoveries after operations for the removal of the lens." It is a fact, nevertheless, that the diabetic subject of cataract, apparently still far from life's end, may never rise from the bed, notwithstanding that the corneal wound has healed kindly, and that the result is all that could be expected so far as concerns the restoration of vision. The opinion of others is that operations otherwise trifling, become serious in the presence of glycosuria. Bumstead and Taylor[3] tell with approval of a Frenchman, Bourgade by name, who met with four cases of phimosis caused by the irritating qualities of saccharine urine, and expressed the opinion that operation was useless during the persistence of the cause. They mention also another French operator who lost two cases on whom he operated for phimosis so caused.

A case[4] recently reported by Wm. Barton Hopkins, surgeon to the Episcopal Hospital, of Philadelphia, may be offered in illustration. A German woman, 50 years of age, was admitted to the hospital March 5, 1885, with schirrus of the left breast. Her urine was examined for albumen, was free from it, and on March 10, an operation was performed. The patient had appeared in excellent health, and no organic disease was suspected. For two days she appeared to be doing well, complaining only of feeling weak. Increasing prostration and increased thirst led the resident surgeon to repeat the examination of the urine the third day after the operation. No albumen was found, but sugar was present in large quantity. On the eighth day the patient died.

Patients otherwise in good health are generally expected to recover after amputation of the breast, also after the operation of the cataract. Patients with diabetes are not all markedly cachectic, but even such as are not may sink rapidly under the sudden strain thrown on

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*From Northwestern Lancet, 6:301-305, (May 15) 1887.

†Read before the St. Louis County Medical Society, April 4, 1887.

[1] On Glycosuria and the Treatment of Diabetes, by William Squire.

[2] Diseases of the Eye, 4th Ed.

[3] Bumstead and Taylor, Venereal Diseases, 5th Ed.

[4] Polyclinic, Dec. 1886, p. 183.

the system by the demand on the reparative powers, and the depressing influence of confinement to the bed.

In your essayist's student days he was taught that the urine of pregnant women should invariably be frequently examined. The teaching was sound, for reasons so obvious that nothing will be said here of the importance of its observance in practice. The subject is mentioned merely to say that in your essayist's observation, to make such examinations frequently during the course of pregnancy is not generally the custom of the profession.

The more immediate object of this paper is to say a few words on the importance of frequently examining the urine in general medical practice. Surgery and obstetrics will therefore be dismissed here. Leaving out of consideration cystitis and neoplasms and other abnormal conditions of the genito-urinary passages, the abnormal constituents of the urine which should be looked for in every case are albumen, casts and sugar. In order not to exceed reasonable limits, no consideration will be given to other constituents.

The importance of examining for sugar prior to the performance of surgical operations has been already sufficiently considered. In the presence of diabetes the prognosis of other affections necessarily becomes more grave. The statement needs no proof, and its acceptance as true is sufficient reason for considering it the duty of the physician to know whether sugar is or is not present, whenever the circumstances of the case will admit of his ascertaining the fact. If the symptoms of glycosuria were always so marked as to lead to the suspicion of its presence, there would be less to be said on the importance of examining for sugar in all cases where the urine is examined. But unfortunately the symptoms are not always marked. In some cases there are no symptoms until a late stage, and then perhaps only those of general debility. It seems in such cases that the extra waste throws on the system a strain increasing so gradually as not to be markedly felt, until the lack of customary physical strength gives certain assurance that something is wrong. It is always desirable to know that so serious and so insidious a disease is not present, and while, therefore, it is advisable always to look for sugar, it is especially requisite in the presence of pruritus genitalium or generalized pruritus, carbuncle and general furunculosis. These conditions so frequently accompany glycosuria that they should always excite suspicion of its presence. The late General Hancock may be cited as a case in point, not only of the connection between diabetes and carbuncle, but also of the insidious march of the disease. The presence of diabetes was not suspected until a few hours before death, when an examination revealed its presence and made necessary the gravest possible prognosis. This happened in the practice of a physician of repute, the successor to the chair of Austin Flint, Sr.

The opinion that albuminuria is always a phenomenon of grave import has pretty generally prevailed. Of late years we are beginning to learn that it is not always so. Practitioners following closely the drift of medical observation and opinion, must recently have seen many references to cases of albuminuria variously entitled intermittent, cyclic, functional or physiological albuminuria, sometimes even styled "albuminuria of health." Some of these have been carelessly reported, since it is stated that casts and blood corpuscles were present with the albumen. Physiological albuminuria with attendant blood corpuscles and casts is hardly a possible condition. Be this as it may, since professional men of scientific standing and undoubted power of observation stand sponsors for this variously-named albuminuria, we are compelled to believe in its existence, whether we call it physiological albuminuria, or believe with Dr. George Johnson "that the presence even of traces of albumen in the urine is always pathological and never physiological."

The fact that albuminuria may be of little import, should not lead to a habit of regarding it lightly. It should, on the contrary, be a stimulus to close study of cases, with a view of determining its import in every case.

Many practitioners examine for albumen only when they find some cause for suspicion of kidney implication. If albumen is found, it means organic change to them, if not found, such change is absent. In the light of present knowledge this reasoning no longer holds. To diagnosticate nephritis when not present may or may not be serious. A mistaken therapeusis may be the occasion of regret on the part of the attendant. If the absence of albumen from the urine lead to a negation as to the presence of organic disease, and such disease be yet present, the mistake is always necessarily serious. Such cases doubtless not infrequently occur. Your essayist was once asked to diagnosticate an obscure case of persistent headache. There was no albuminuria, and the statement was made that repeated examinations had always resulted in this way. Nevertheless a diagnosis of organic kidney disease, probably renal cirrhosis, was made, and was ignored by the family physician. Six months afterward the patient died with general anasarca and oedema of the lungs, albuminuria appearing just three days before death.

It must be admitted that nephritis occurs with albuminuria. This means that where certainty as to the condition of the kidney is desired, a search for casts must be made when albuminuria is not present. If it be admitted that albuminuria does not necessarily mean nephritis, it then follows that to reach certainty this search must be made even when albuminuria is present. Nothing more need be said as to the necessity for familiarity with the use of the microscope in its application to the examination of urine.

There is a field of usefulness for urinary examination upon which, in your essayist's observation, little or no stress is laid by our teachers of therapeutics. It is making use of such examinations to determine the advisability of beginning the administration of certain drugs, and of continuance in their use when once begun. Many drugs in common use have an injurious effect on the kidney. Such for instance are cantharides, copaiba, cubebs, chlorate of potassium, squill and turpentine. All are irritants, and in large doses may be the cause of kidney lesions. Of squill, for instance, H. C. Wood[5] says that the one contra-indication to its use "is the existence of any form of Bright's disease or of acute irritation of the kidney." Yet squill has been so commonly used without thought of danger, that it is a popular remedy in very general use for throat and chest affections of children. Of the frequent use of copaiba and cubebs without precaution it is unnecessary to speak at length. Mere mention is enough.

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[5] Materia Medica, 5th Ed., p. 495.

At page eighty-eight of the second edition of Millard's work on Bright's disease, is reported a case of nephritis from the use of ginger in large doses. As the result twice followed immediately the ingestion of the ginger, the cause alleged is doubtless the true cause.

Much has lately been written of the use of turpentine in large doses, even for infants, as a cure for diphtheria. Your essayist, speaking from memory only, cannot recall any caution given as to its use in cases attended by albuminuria.

Salicylic acid is excreted principally by the kidneys. Of the urine, H. C. Wood says that "it not rarely contains albumen, evidently the product of a local irritation of the kidneys," and he adds that a case has been reported "in which the irritation was so severe as to give rise to haematuria." In commenting on the appearance of alarming symptoms that have followed the administration of salicylic acid, Bartholow[6] tells us that "the existence of albuminuria is an important factor in the causation of bad results." Yet salicylic acid is a much prescribed drug, and especially in rheumatism it is very commonly both used and abused. There is perhaps no need to say that caution is necessary in the use of a drug. In the use of salicylic acid, however, there is probably no less necessity for caution in its proper use, since in acute cases there is demanded the continuous administration of large doses of the drug until the desired effect is produced, or the inapplicability of the drug to the case in hand is demonstrated. The influence on the structure and function of the kidney of the long-continued medicinal administration of salicylic acid, offers a field of fair promise for investigation.

Arsenic, in cases of poisoning that do not terminate too quickly, causes organic changes in the kidney. Notwithstanding that our text books on therapeutics and our writers on dermatology speak very generally of its limited field of usefulness in dermatological practice, arsenic is today, as it has been in the past, the main reliance of a large portion of our profession in most cases of skin disease. This is not mere assertion. A perusal of the pages of the *Journal of Cutaneous and Venereal Diseases* for the past few months, will be sufficiently convincing of the truth of the statement. Yet arsenic to be of value must, in the cases to which it is applicable, be pushed to the limit of tolerance.

The most dangerous of all drugs, from this point of view, is chlorate of potassium, because of the frequency of its use in large doses. Like squill it has become a popular remedy, self-prescribed in thousands of cases of mouth and throat affections. It is prescribed by physicians in large doses in saturated solution even for young children, and even today in dangerous doses is praised as a specific for diphtheria, a disease of which one of the common complications is nephritis.

The danger of such a course should be known to every physician. Cases of poisoning, with death from the ensuing nephritis, have been reported. If this subject is new to anyone, several pages of very interesting reading on the subject can be found in Jacobi's work on diphtheria. Jacobi holds that chlorate of potassium, not diphtheria, should be held responsible for some of the deaths. H. C. Wood[7] says: "It is probable that in diphtheria deaths attributed to the disease have often really been produced by the chlorate."

If this action of these drugs be kept in mind, it seems to the essayist a necessary admission that an examination of the urine is a highly desirable preliminary to their administration, especially where they are prescribed in large doses, or their use is to be long continued.

Your essayist is well aware of the difficulties that oppose themselves to the more frequent use of this means of diagnosis and prognosis. Our patients have just emptied their bladders, or the excitement of a visit to or from the doctor seems to act as an inhibiting agent. They promise to send or bring the urine in a few hours, but they forget the promise or neglect to keep it. The ignorance and willfulness of our patients are necessary limitations of our success; but if we are not obeyed, we also are not responsible for mishaps. A love of our own ease and a dislike to work for little or nothing are unnecessary limitations. There is little excuse for the man who enters the profession with no philanthropy in his heart. For the sake of humanity, if once we undertake a case, we should do our best by it regardless of the pay question. The alternative is not to undertake it, but in medicine, as in morals, virtue is its own reward.

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[6] Materia Medica, 4th Ed., p. 533.

[7] Materia Medica, 5th Ed., p. 509.

Glandular Tuberculosis*†

C. H. Mayo, M.D.

Rochester, Minnesota

SEVERAL years after the discovery of the bacillus of tuberculosis, first considered only in its relation to phthisis, bacteriologists and pathologists succeeded in classing many of the chronic osseous diseases, as well as those prolonged inflammations of serous cavities, as the result of the same germ action.

Later, and not very recently either, a class of disease designated in older works by the comprehensive terms scrofula or struma has been added to this list, and it is to these cases we wish to call attention in this paper.

In a study of the causation of disease, one of the most important elements we may consider to be a weakness or lack of vital force, possibly a want of development of certain structures formed by one of the blastodermic layers.

In some cases we have a lack of epithelial resistance taken in a general sense.

Thus we cannot but notice a peculiar susceptibility of a certain class to skin diseases, of another to lung difficulties, and with but little experience learn to read this as if marked over these patients, and we can usually elicit a concomitant family history, possibly showing whole families destroyed by this scourge or with allied disease.

The same can be said of another class marked by lymphatic weakness, and it is not uncommon to treat several members of the same family for these glandular enlargements usually found in the neck. We believe that the tonsils have more than a passing relation to the cervical glands as the bearers of infection, and are certain that they have been the medium in a few cases which we had under our care for sometime.

We may recognize a diathesis, an inherited or acquired weakness rather than an inherited disease.

Our older writers recognized tuberculosis or rather its results, but limited its application to phthisis, and in writing on the glandular diseases, well noting a like diathesis in both cases, they did not connect the common aetiology of the two.

In this paper we shall accept the theory that there is a common aetiology.

In considering the fatal effect of tuberculosis, it is probable that death results primarily only when we have this process affecting the brain, which result is due to pressure.

With the development occurring in all other places, death as a rule results from suppuration and its consequences, produced by a mixed infection.

When occurring in the lungs, we have every advantage for growth and development by an enormous blood supply, yielding walls having but a small amount of connective tissue and with open air passages, giving every advantage for mixed infection and no facility for drainage.

In our treatment of these glandular cases we have made a thorough trial of iodine in its various forms, internally, externally and by hypodermic injection.

Locally and by injection it was found in our hands, at least, to be too irritating, in some cases seeming to increase rather than to alleviate.

The result was very similar with the use of glycerine, iodoform, alcohol and various other similar remedies, all these having the additional disadvantage of being very painful.

With internal medication we came to the conclusion in regard to the use of iodine, that it was impossible to so saturate the system as to have a destructive effect on the bacilli.

We also experimented with arsenical preparations, in one case carrying their administration to the extent of a drachm per day of Fowler's solution without relief.

So far the specific for tuberculosis has not been discovered, and we have no remedy which exerts a cell selection upon this formidable disease.

We now limit our treatment to one of support by various hygienic measures and tonics, deriving great benefit from the administration of cod liver oil.

Much concerning the treatment of these cases may be learned by watching nature's process of dealing with foreign bodies, which is by absorption, encapsulation or evulsion.

In many cases we may have an inoculation of small dosage, the gland or glands may enlarge and by absorption or encapsulation the invasion proceed no farther, showing an individual ability to overcome a certain amount of poisoning, or we may have evulsion evidenced by pus formation which eventually works to the surface, possibly not before a succession of changes by absorption and repeated softening.

Again in a very few cases we have an inoculation of large dosage or possibly an extreme susceptibility of the individual; in either case we have a rapid invasion of the lymph system and many of these cases die from general tuberculosis.

This clearly gives our indication for surgical treatment.

In cases seen early, to first make an effort to raise the natural resistance by internal medication combined with hygienic measures as we have outlined, and failing to get absorption or encapsulation to use surgical measures to prevent further invasion, also to save months of disfigurement to be followed in the end by months of suppuration from ugly sinuses, which heal for a time only to break out again in discharge, until the last vestige of the gland attacked is destroyed, while the scars thus produced seem never done contracting.

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*From Northwestern Lancet, 10:261-262, (Aug. 1) 1890.

†This is the first paper by Dr. Charles H. Mayo published anywhere.

A correct operation is the complete removal of all glands possible with their vessels. This requires very careful dissection, but its application is often limited as we may not be called upon for advice until one or more glands has softened or suppurated. In such cases we assist nature's effort by opening the sac and removing its contents with a sharp curette, and do not attempt to remove the barrier already proven effective. Then to enable us to safely leave the capsule it is thoroughly swabbed out by chloride of mercury solution, 1:5000, and its cavity packed with iodoform gauze, sutures of silk inserted but not tied and the dressing left seventy-two hours.

The iodoform pack is then removed, the wound approximated and the sutures previously inserted tied. We employ the same method of dressing with those cases in which we have ruptured the capsule and contaminated the wound in removal.

All other glands enlarged and of sufficient firmness can be removed entire and the wound closed aseptically.

In dealing with all tuberculous deposits it is of the utmost importance to be aseptic, and to make sure of it *be* antiseptic; the cases thus treated will heal readily; others will suppurate and require repeated dressings.

A peculiar phenomenon occurring in many cases packed with iodoform gauze is a rise of temperature on the second day; this may be the result of nerve pressure, the irritation of a foreign body or the effect of iodoform, we are unable to say which, but have found it does not indicate wound complication.

With an operative experience of over twenty of these cases, most of which were hospital patients, we earnestly recommend surgical measures in such chronic cases and believe that the operation in selected cases is devoid of great danger.

Diabetes Mellitus*†

Charles W. Drew, M.D., Ph.B.

Minneapolis, Minnesota

THE term diabetes mellitus or glycosuria is applied to a disease, the principal phenomenon of which is the persistent and usually long-continued elimination of grape sugar by the kidneys, the quantity of the urine being at the same time usually very considerably increased.

The cause of diabetes is not certainly known. It occurs at all ages, though with greater frequency in middle and later years, and in both sexes, though about twice as frequently in the male as in the female. In some cases the tendency toward its development is, without doubt, inherited, while in others its development is attributed to exposure, to habits of life, to mental disturbance or to injuries of various kinds; while in a still larger number of cases the determining cause must be regarded as unknown. Dr. Richard Schmitz *(British Medical Journal)*, states that of 600 cases of diabetes treated by him, "248 were in families in which diabetes had already appeared; 96 were in neuropathic or psychopathic families, and in 183 cases the exciting cause of the disease was to be attributed to some acute disturbance of the nervous centres. In 153 cases the disease was attributed to an excessive indulgence in sugar." It is very doubtful, however, whether in general, the determining causes can be as distinctly classified as has been attempted by this reporter.

In general, diabetes develops insidiously. Probably the patient will first observe that the quantity of his urine is day by day increasing; that his thirst is becoming more and more intense and constant; that his appetite is getting to be voracious; and that in spite of the ingestion of such unnaturally large quantities of food and drink, he is rapidly losing flesh and strength, and becoming unable to attend to his usual avocations, or even in many cases to undergo any exertion whatever. The symptoms, however, present wide variations and can profitably be considered seriatim.

The quantity of urine is generally very greatly increased. It is sometimes very little greater than normal, but usually averages between six and twelve pints daily, though frequently rising to twenty, thirty or even more. The quantity is mainly regulated by the amount of fluid ingested; but in most cases the thirst is intense, and in consequence of this constant craving for drink, the amount of water consumed is very large. The patient usually micturates freely and frequently during the day, and is compelled to arise and relieve himself several times during the night. The urine is of a pale, yellowish color, slightly acid, clear and watery and free from sediment. It usually lacks the characteristic urinous odor and possesses a peculiar sweetish odor which is often quite distinctive. The specific gravity of the urine, in spite of largeness of the quantity, is very greatly increased, rarely being below 1035 and frequently reaching 1050 or 1060, and cases are upon record in which a density of 1070 was observed. This increase in density is due to an increase in the solid constituents of the urine, and upon analysis we never fail to find evidence of the presence of large quantities of glucose or grape-sugar. The amount of this substance which is eliminated daily, varies widely, yet an average amount may be stated to be from eight to twenty ounces daily. It is eliminated most abundantly after meals, and particularly if the food was starchy or saccharine in its character. Under opposite circumstances its quantity diminishes, and in some cases it may be caused to entirely disappear if the diet be restricted to nitrogenous substances. This however is only infrequently the case.

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*From Northwestern Lancet, 5:323-327, (June 1) 1886.

†Read before the Unity Club of Minneapolis.

The absolute amount of urea eliminated by a diabetic patient is, in general, greater than normal, though relatively it is decreased owing to the augmented bulk. In a certain proportion of cases the urine is found to be albuminous, and hyaline and other varieties of casts are to be found in it. This is more particularly the case in advanced stages of the disease. The urine of a diabetic patient is apt to be irritating to the genitals and surrounding tissues, and these parts are often found to be red and irritable, and occasionally excoriated or eczematous. The sexual appetite is apt to be diminished, and the virile power, too, gradually disappears.

One of the most distressing symptoms is the intense and constant craving for drink, and it is one of the earliest to appear. The appetite is usually voracious, but the opposite condition of anorexia may exist, and in either case digestion and assimilation are usually impaired to a greater or less degree. The skin of a diabetic patient is usually dry and harsh, and a severe sensation of itching is frequently present, as also are eczematous, furuncular or other cutaneous eruptions. The symptoms referable to the thoracic viscera are simply those which are characteristic of wasting diseases. The bowels are usually constipated, and the motions abnormally dry, though in some cases, and not infrequently as a fatal termination is approached, dysenteric diarrhoea supervenes. The blood upon a chemical examination shows the presence of glucose, an average of from .2 to .5 per cent being found.

Nervous phenomena of diverse sorts often display themselves. In some cases the patient becomes apathetic, morose and, toward the close, drowsy or comatose. In others, insanity, hyperaesthesia, or loss of motility are displayed. Visual disorders are not uncommon. In some instances the patient becomes prematurely presbyopic, in others he suffers from amblyopia, and in still others a tendency toward the development of cataract shows itself.

The temperature is generally normal or slightly below, though in some cases there are occasional elevations observed. Emaciation is almost constant; the fat disappears, the muscles become shrunken, the skin seems tightly drawn over the tissues, and facial expressions become almost characteristically altered. In some cases, however, particularly in advanced life, the proportion of fatty matter in the tissues does not seem to be diminished, but to remain as great as is natural to the end. Often, as the end approaches, anasarca develops, and not very infrequently gangrene of various parts.

There seems to be a marked tendency upon the part of diabetic patients toward the development of pulmonic phthisis, and it has been estimated that nearly or quite 50 per cent suffer from it. The form of the disease is usually that which is characterized by caseous consolidation, with a tendency toward disintegration and the formation of cavities.

In some cases the progress of the disease is extremely acute and rapid. Dr. Jones reports a case in the *London Lancet* in which the supposed duration was only five days, and there are many on record in which a fatal result followed after a few weeks of illness. In general, however, the disease persists for from one to three years before death takes places, and in exceptional cases may exist for ten or more years. Recovery is exceedingly rare. The patient usually dies from exhaustion, often hastened by phthisis, dysentery or gangrene, or coma may supervene and the patient die in this state.

Morbid anatomy reveals little or nothing as to the nature or processes of diabetes. Beyond the characteristic lesions of dysenteric diarrhoea, of pulmonic phthisis, and of cataract, which are by no means present in all cases, there remains little to describe. The kidneys are sometimes enlarged and congested, and in some cases the tubules are to a greater or less extent denuded of their epithelium, or present degenerative changes of the epithelium into fat. In some cases the liver and other of the chylo-poetic viscera present the changes characteristic of congestion, or in others the liver is cirrhotic, while in a still larger number these organs are without evidence or pathological lesions. Careful examinations of the nervous system have repeatedly been made, but no constant lesions are to be detected. Tubercular and other tumors have been found about the base of the brain, but neither these nor any of the other pathological conditions which have been occasionally discovered, seem to belong constantly to this disease.

Until the time of the researches of Claude Bernard in 1848, nothing whatever can be said to have been known in regard to the pathology of diabetes. The publication of his experiments, and of the many others which have since been made, have enlightened us somewhat in the matter, though there is still abundant opportunity for still farther elucidation of the subject. These experiments have proven that the liver possesses not only the power of elaborating the bile, but also the power of transforming, in some little understood manner, the albuminous, starchy and saccharine elements of the food into a peculiar substance termed glycogen, which is closely allied to starch in many respects, and which is readily convertible by ferments, into glucose or grape sugar. The ultimate disposition of this glycogen is at present undetermined, some asserting its probable transformation into fats, others that it becomes changed into more complex organic compounds of various sorts which exist in the body, as the accumulated starch in the plant is supposed to be the basis of the many vegetable organic compounds.

The liver thus seems to serve as a barrier to prevent the passage of saccharine ingesta into the blood, and it is at present believed that no more than traces of glucose exist in the systemic circulation physiologically.

The experiments of Bernard, Schiff and many others have tended to demonstrate the influence which the nervous system exercises over this glycogenic function of the liver. It has been proven that by irritating various parts of the central nervous system, this regulative function may be temporarily inhibited, and a large amount of glucose made to appear in the urine; or in other words a temporary diabetes may be induced. A puncture of the medulla within the area described by Eckhard as the diabetic area, readily produces this result. The glycogen stored up in the liver disappears, and the blood becomes loaded with sugar, which is eliminated by the kidneys. The glycogenic function of the liver is therefore subject to the influence of the nervous system, and in particular to the influence of that portion of the cerebro-spinal axis which is known as the vaso-motor centre. The path of this influence may be traced along the cervical spinal cord, as far down as the third or fourth dorsal vertebra (in rabbits); from the spinal cord to the first thoracic ganglion, and from thence to the liver by some, at present, undetermined channel. The method by which diabetes is induced as the result of the irritation of the hepatic vaso-motor centre, is not certainly known, though many authorities account for it by the consequent vascular dilatation of the hepatic arterioles, and instance as proof other conditions in which a hyperaemia of the liver exists, in which diabetes likewise temporarily appears.

Schiff, by dividing the anterior columns of the cervical spinal cord, likewise produced diabetes, of a considerably more permanent character, which he explained upon the assumption, that by cutting the hepatic areas off from the regulating influence of the vaso-motor centres, a paralytic dilatation of the arterioles was engendered and hence a passive hyperaemia. Experiment would therefore seem to show, that diabetes depends upon a dilatation of the hepatic vessels, with accumulation of blood in them, and a rapid flow of blood through them, and consequently on increased or rather modified functional activity of the liver; and that this dilatation may be either active, the result of irritation of certain portions of the nervous system (producing for the most part a temporary condition of diabetes), or passive, the result of paralytic dilatation (inducing, as a rule, a chronic form of diabetes). According to these views, thus briefly stated, the occasional and temporary presence of sugar in the urine would seem to have an irritation, the typical form of diabetes a paralytic origin; the latter probably depending upon some peculiar form of neurosis at present undiscovered and unstudied.

The treatment of diabetes at present principally relied upon is the dietetic, which consists in feeding the patient upon a dietary from which starch and sugar have been as nearly as possible eliminated. Under such a regime in some cases the sugar will rapidly decrease and even disappear, but in a larger proportion of cases the diminution is much less marked. Among drugs, there are comparatively few which have not at one time or another been counted as of the greatest value, but thus far none seem to have stood the test of experience and to have maintained their high place. Usually the treatment must be according to the leading symptoms, and directed as thoroughly as possible toward sustaining the patient. Among the drugs which are most extensively employed at present with a view to decreasing the quantity of sugar, are opium and the bromides, which probably act by relieving nervous irritability by producing sedation; strychnia, which probably increases the tone of the affected nerves by its tonic influence, and ergot which may tend to constringe the hepatic capillaries through its influence upon the involuntary muscular fibre.

ANTI-VACCINATION*

In this age, nothing is well established or sacred enough to escape the danger of the interrogation point. One would think that the approximate eradication of the old scourge of variola would have established the efficacy and wisdom of vaccination. A century ago small-pox was as common as measles is today. Now, there are many physicians who have never seen a case of small-pox.

Yet there is opposition to vaccination and it is not confined to the ignorant. As danger approaches our own vicinity, there are signs of this opposition, and officials approach the subject of enforced vaccination with timidity. Of course much of the unwillingness to submit to vaccination may be traced to ignorance of the subject, even by people who are intelligent and generally well-informed; but we believe that the objectors have some just cause for complaint. It must be admitted that there is cause of complaint in the material. Our own experience has been that of many others. The commercial virus with which we are furnished is in the first place very unreliable for primary vaccinations. Secondly, when it does take, some fearfully sore arms result, some of them of such a nature as to give color to the suspicion of blood-poisoning. Of course the trouble may be from the uncleanliness of the operator; but it is quite as likely that the producer of the virus is at fault. Much of the virus in the market is mixed with blood, showing that the pustule is squeezed in order to exhaust its contents.

Physicians are the ones to move in the matter. They should in the first place charge more for vaccinating. The customary rate, $1.00, is absurdly low. A higher charge will enable them to pay more for virus and to demand better virus.

The danger of serious opposition to enforced vaccination, should it become necessary, is a real one and is appreciated by many of our physicians.

Would it not be well for organizations of physicians in the Northwest to take some action toward securing a supply of reliable virus? The rates for vaccinating should be raised, and proportionately more care taken in securing material and using it. It is a shame that one of the greatest benefits which science has given to men, should be injured in public estimation, by carelessness in application.

*Editorial from Northwestern Lancet, November 15, 1885.

Food for Infants*†

Hiram Corson, M.D.

Pennsylvania

IF it be an important duty to check disease and stay the hand of death in the aged, whose genius and talents have been already exercised for the good of their country, who at furthest can live but a few years longer, and who are bound to life by few ties, how much more important to preserve the lives of children in whom are centered the hopes and affections of fond parents, and all of whose powers are ready to develop themselves for the joy of their parents, the glory of their manhood, and the benefit of human society. They are to supply the places of those worn out in the service of mankind, and yet how lightly we regard their early death. They die by thousands for want of proper nourishment. Even the best of mothers, through ignorance of the proper mode of treatment, see them pine and die, though the keenest affection watches night and day over the cradle.

During the last few years I have noticed that all our young men who come to practice in the country, and even those whom I have met who practice in cities, invariably give the same advice to the mothers who consult them in relation to the proper mode of feeding children to be raised by hand. They all direct them to give one-third milk and two-thirds water. And they give the reason for adding the water, viz.: "The whole milk is too strong." Now where do they get this knowledge? Has it come down from the authors of forty and fifty years ago to the present teachers, and do they so instruct their pupils? That is the rational conclusion. If we have made any progress in all this time, it has not been to lessen the dilution, but to increase it from one-half to two-thirds water; and with this the great body of the profession is satisfied; and yet in the very face of this treatment stands the appalling fact, that from "forty to eighty per cent," "seven out of every eight" of the little creatures perish within a few months after their birth.

In the early part of my practice, I gave the ordinary directions to those who inquired of me, namely, to give milk and water sweetened. Supposing the mother or nurse knew the proper quantity to be given in a day, I said nothing about that. And this neglect to speak of the quantity is, I think, very common with physicians. Thirty-two years ago, it became necessary to have my own child reared by hand, and I then discovered how ignorant I had been in relation to the *quantity of food* necessary for an infant, and was also enabled to observe the effects of an insufficient amount of food. Subsequent observations through many years have convinced me that there is not more than one woman in five, and perhaps not more than one in ten, who knows what amount of milk a child should have. Nor is there one physician in very many who can tell the mother or nurse what quantity it would need in twenty-four hours. I have repeatedly asked mothers and nurses and physicians, and it has been rarely that they have even approximated the truth. And this, because their attention had never been specially drawn to it.

Now, scarcely any child of one month will be satisfied with a pint daily; many will take a quart; the average is between them. But I do not mean that to this quantity twice as much water should be added, thus making nearly three quarts of fluid, for no child could take so much in twenty-four hours. Suppose, then, that a child can only take three half pints of fluid into its stomach in a day, and two half pints of it are water, it will then only get eight ounces of milk, when it needs twenty-four, or thirty-two ounces daily. There are two kinds of cases which I desire to notice. First, where the child receives no milk from the mother; second, where it gets a *little* from the mother, and *some* from the bottle; and the latter case is often more difficult to manage than the former.

Suppose, then, that, in a case of the first class, a child should only get less than a pint of the mixture (two-thirds water and one-third milk) daily; the result will be that the child will be hungry, peevish, fretful, will moan, start in sleep, emaciate, look pale, have acid stomach, colic, be considered sick, be dosed with medicine, get worse (for the food is still insufficient in quantity, and defective in quality), the physician be sent for, and, however judicious his advice or prescriptions, if he fail to furnish the proper food, death will carry off the little sufferer. It is not uncommon to see a child who has been dosed for weeks with medicine by the mother, and often under direction of the physician, who, oblivious of the fact that it was suffering for want of food, prescribed a change of diet, or a diminution of its quantity, fearing that "the stomach was too weak to bear such food." Many children are thus starved and dosed to death.

I hope, in describing these every-day cases of starvation in children, to recall to your minds many cases which you have seen, that will convince you that I know of what I affirm. Called to a child from one to five months old, I find it thin, pale, sad-looking, moans much, not a scream, sharp and shrill, but a low, sad moan. It does not seem very sick, but the mother says she is "wearied out with it." If it be warm weather, there is diarrhoea, perhaps; or if cold weather, it may be very costive. Sometimes it is blue-looking, as in cyanosis. As I hear its history, and look upon its shriveled face, its thin arms, and hear its sad moan, I know that it is starving. I ask the mother if she has much milk for it, and find that she does not nurse it, but is raising it by hand. "How much do you give it daily?" "I give it as much as it will take." "Yes, but how much?" "Well, I don't know exactly how much." "Do you give it a teacupful in a day?" "I think I do—perhaps more than that." "Do you add water to the milk?" "Yes, two tablespoonfuls of water to one of milk." "Then, you mean to say that you gave your child one, or perhaps two teacupfuls of milk and water, not of milk alone?" "Yes, milk and water." Now, if this be a truthful statement, the child gets one third of two teacupfuls of milk daily, when it ought to have one or two quarts. The truth is, she does not know at all how much the child gets.

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*From Northwest Medical and Surgical Journal, 1:165-176, (Nov.) 1870.

†Read before the Pennsylvania State Medical Society.

I will mention one of many similar cases. Some years ago I was called to a child which was thought to be laboring under disease of the heart. Its little pinched-up, old face (starving children have an aged look), the fat all gone, and the attenuated muscles standing out like strings when it cried, or whined, satisfied me that it was starving. "Why do you say it has disease of the heart?" I asked. "The doctor told me so," she replied. "Are you giving it medicine?" "No; we did give it some for a time, but we think it is incurable now." I examined its chest; the organs layed healthfully. I told her it was starving; found she was giving it only a teacupful of milk, one half water, in a whole day. It was two months old, and I have seldom seen so wasted a child. I directed a full diet of pure milk—a quart a day if it could take it—and it was quiet from the moment its stomach was well filled with good food, and in a short time was well, and growing finely.

In two weeks from that time I was called to a neighbor's child, a little older and in a similar condition, supposed by the mother to be the result of a summer complaint which was troubling it. She had heard of the change produced in the other child by the change of food, and as she had also fed her child with the water and milk mixture, she concluded that perhaps it too was suffering from an insufficient amount of food. Disregarding the bowel-complaint, I directed as much good milk as it could take, and in a few days it was well.

A short time after this, I was called to a third child, more than a year old. It was a living skeleton, with numerous sores in various parts of the body. It had been sickly always, the mother said—gradually getting weaker. She had always fed it with milk and water, about half and half, though she had been told by the nurse who was with her the first month that it ought to be two-thirds water. It was apparent, after a careful investigation of the case, that it had been a case of slow starvation, which was now nearly over. It died next day. Cases like the three given are not rare. They are every-day cases.

But let us now look at the second class of cases, where the mother has *some* milk, but not enough for the child; we are not generally called to such children until they are over three months, often five or six months of age. Here we find, also, the symptoms of incipient starvation spoken of above, but generally milder in degree; and are asked to see it, not simply because the child is sickly and puny, for it has been so more or less for months, but because "it is broken out with sores." Now this mother has no idea how much the child gets from the breast. She only knows that it gets very little, and yet at the age of this child, one well fed would take more than a quart and a pint of good milk daily, besides what the mother's breast yields. And this is a common case; not more than one mother in five would know any more about the proper quantity to be used than this one. The physician has not thought of this, perhaps, but is regarding the child as a sick one, not a starving one. He leaves the feeding to the mother; does not charge himself with that, but only with the disease which he has been called to cure. Now what prospect of relief for this child? It is starving, but the mother, not knowing this, sends for the doctor to cure it. It has a sickly appearance; is also full of sores. The mother tells him of its sufferings, and he, not suspecting the cause of the sores, perhaps deems them the *cause* of ill-health. His prescription, if he fails to give it food, but increases its weakness and suffering and hastens its death.

I feel quite certain that it is almost as easy to raise children by hand, if they have an abundant supply of good undiluted cow's milk, as it is by the breast. But the bottle should always be used instead of the spoon. My plan is to direct as much milk as the child can take, and as often as it wants it; but always of the temperature nearly of the mother's milk. In winter time, or when milk is kept in a deep cave, or in a spring-house, I direct that as much boiling water be added to it as will bring it to that temperature. It takes but very little water, and is more convenient than heating it over the fire. To a pint of cool milk two tablespoonfuls of boiling water should be added—the whole then well sweetened. A healthy child of one month will take that much twice in the twenty-four hours. Some children at one month, or between one and two months, will take more than a quart daily; and a few can scarcely take so much. If, then, you are called to such cases as I have described, or to those milder cases where the child is fed half enough, or even a little more than that, place no reliance on the word of the nurse, or mother, "that she feeds it plenty, or that it will not suck or eat, or cannot keep it down." I have frequently seen a mother let the little hungry creature tug and pull at her flaccid, milkless breast, without being aware that the child got nothing from it; and yet she thought "it was getting sick." In those cases hold back the medicine for a few days and try the milk. Those children who have been nursed, and fed a little by the spoon, will sometimes wholly refuse to take the bottle in lieu of the breast, and the mother takes it for evidence that they do not like the cow's milk, and will therefore attempt to raise them on some one of the many farinaceous articles recommended, and in this she will be likely to fail. A little perseverance will generally induce them to take the bottle; and when once used to it, so that they can steady it in their own hands, they will rarely take too much.

I sincerely hope that our graduates, hereafter, will not go forth to practice, believing that the proper substitute for the mother's milk is a *mixture of two-thirds water and one-third cow's milk*. Rather let them be instructed that the higher the organization of the animal, the more abundant will be the nutritive constituents of the milk, and as man is at the head of the animal creation, human milk is more highly organized than that of any other animal. If, then, you wish to use any other milk as a substitute for the mother's, instead of diluting it with water, it would seem to be more appropriate to add to it some nutritive substance. I have never used for infants any other milk than that of cows.

How common it is to hear a mother say, "My child is getting very hearty now; but until it was nearly a year old it was very puny; I thought I would lose it." It was puny for the want of food; it was starved on water and milk but, when it got old enough "to sit up at the table, and get a little of anything," it began to improve, and yet the mother did not perceive the cause of the change.

If, then, in the country, where the milk is good, a child of a month needs nearly a quart daily, without dilution, how very important that no water shall be added to the milk brought to the city by milkmen! It is not too much to say that before it reaches the citizen's door it is only two-thirds milk. Now, should the doctor direct that the milk should be diluted by adding one-half water, you can see that the food of the child will be four parts milk and five parts water—a starving mixture even if given in full quantity. Add to this the fact that much of the milk taken to the cities is of indifferent quality, and the difficulty of rearing children there, by hand, will be apparent. But much of the danger may be averted by giving the milk without the addition of any diluent, and by adding, when the child's age will allow it, some farinaceous substance. I have just heard of a case in a rich, fashionable family, the recording of which may be instructive. The child is fed on what may be called corn-meal tea, or soup. The corn-meal is boiled very thoroughly; the water then strained off, and a little milk or cream added, about as people use it in tea or coffee; and this is all the poor child gets. It is now a year old, weak, pale, fretful, unable, even when held up, to stand on its limbs, presenting a pitiable picture of suffering caused by want of food, under the physician's direction.

I have but merely glanced at this subject. My object has been simply to call attention to the fact that many thousands of the children who annually die prematurely, die from want of food. They are starved to death, and we are not blameless.

PASTEUR'S TRIUMPH*

The experience of Pasteur in establishing the value of his system of preventive inoculation against rabies has been a varied one. At first the discovery was received with the greatest enthusiasm, not only by the general public which ever gives its full faith to all new claims of scientific discovery, but even by that learned and dignified body, the French Academy of Science, which was so moved that it broke out into applause when Pasteur described to it the history of his investigations, and the success of the experiments which seemed to justify his theories. This wide-spread belief in the efficacy of the inoculations brought patients to Pasteur's door by the thousand, from every country and every condition in life. Subscriptions for a "Pasteur Institute" in Paris poured in, and in other countries it was undertaken to provide establishments where the protective inoculations could be administered. All went on swimmingly, and the few doubters could scarcely find any one ready to listen to their prognostications.

Then came the inevitable reaction. Some of those who were inoculated died, especially those who had been bitten by wolves. The first deaths were easily explained: the inoculations had been undertaken too late; the bites were on exposed parts of the body; the wolf rabies was essentially different from and more virulent than canine rabies; the deaths were not from rabies at all. Then Pasteur's methods and results were assailed upon by such men as Frisch in Vienna, Peter in Paris, and Spitzka in New York. It was even claimed that the inoculations were to be blamed for some of the deaths among the inoculated, especially those where the "intensive form" had been tried.

But now, when Pasteur and his supporters seemed likely to get the worst of the discussion and the inoculations against rabies to fall into discredit, there comes the long expected report of the commission appointed more than a year ago by direction of the British Parliament to enquire into Pasteur's treatment of rabies. No higher tribunal could be named to try the cause than this commission, containing Sir James Paget, Sir Joseph Lister, Drs. Richard Quain and Lauder Brunton, Mr. Victor Horsley and other distinguished men, and their inquiry has been conducted with the utmost thoroughness, and in the most unpartisan spirit.

The points which the committee has fully established by its own independent experiments are: that the disease which Pasteur has kept up by inoculation is really rabies; that its virus is contained in the spinal cord; that this virus is capable of reproducing rabies by inoculation. These points were also covered by the investigations of Dr. H. C. Ernst, of the Harvard Medical School, who was able by his own independent experiments to substantiate the correctness of Pasteur's statements. The Committee estimates from a most conservative consideration of the statistics of hydrophobia, that Pasteur's treatment has so far saved no less than one hundred lives. The Committee's own words are:

"From the evidence of all these facts we think it certain that the inoculations practised by M. Pasteur on persons bitten by rabid animals have prevented the occurrence of hydrophobia in a large proportion of those who, if they had not been so inoculated, would have died."

In the face of such testimony as this, much of it in a form entirely different from that of any evidence upon the subject hitherto offered, it may be considered as settled that Pasteur's inoculations have an established place among therapeutical measures, and are no longer to be looked upon as simply experimental. The next thing necessary will be the establishment on a sure basis of other establishments where Pasteur's inoculations can be practised, and one at least of these establishments will be, we hope, in this country.

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*Editorial from Northwestern Lancet, August 1. 1887.

FOREIGN CORRESPONDENCE*

London, Nov. 15, 1881.

Dear Doctor:

In complying with your kind invitation to furnish something for the columns of your new Journal, I shall only endeavor to report my observations upon interesting cases and impressions received of the habits and customs of the medical men of this section. I wish to submit the brief of a very remarkable case by Dr. Christian Fenger, of Chicago, of extirpation of uterus through vagina:

(The case, having been published in the Chicago Medical Review, is omitted.)

I saw this patient with Dr. Fenger Oct. 10th, three weeks after operation. She was somewhat anaemic, but bore no evidence of having undergone so formidable an operation. From quite an extensive acquaintance among American medical men, I think I can prophesy for this brilliant yet reserved and unpretentious young German, a future second to no young medical man in America. Was invited by Dr. Thomas to an ovariatomy at the Woman's Hospital, October 15th. Patient, a girl of 20, in good health. Upon opening into abdominal cavity the tumor was found to be a fibro-cyst of left kidney. Weight about ten pounds. The adhesions were quite firm, but its removal was not attended by much difficulty. The patient was doing well three days after operation.

I am very much pleased with the London medical men, and find them all courteous and pleasant gentlemen. Am spending most of my time at Guy's Hospital. Mr. Bryant is the senior surgeon at this great hospital.

To give you an idea of the immense amount of material these London hospitals afford, I will say the reports of St. Bartholomew's Hospital shows that they treated in 1880 one hundred and eighty thousand patients, at the hospital and dispensary, and Guy's report shows eighty thousand treated the same year. They hold two surgical clinics weekly at Guy's. The operators are Bryant, Davies, Colley, Howse, and Clement Lucas. They operate from 1:30 P. M. until 5 or 8 o'clock in the evening, according to the amount of material. Mr. Bryant's great reputation as a bold and successful operator draws the best material of the city to Guy's. Mr. Lister invited me to attend his clinics at King's college. He is a remarkably fine teacher and pays great attention to the details of an operation. In operating he gives great preference to the scissors and grooved director, and is never in a hurry. He is as firm a believer in Listerism as ever, and uses the spray in all operations. There is a great divergence of opinion among the London surgeons as to the efficacy of the spray, many not using it at all; but absolute cleanliness and disinfection of instruments has been universal with nearly all operators. Ihave seen a few exceptions. The senior surgeon at St. Bartholomew's, in an amputation at hip joint, yesterday paid no attention to the spray or immersion of instruments in a disinfectant.

I am delighted with the English style of medical education. At the last examination of the College of Physicians, of young men to enter the profession, 34 per cent were rejected, and the last examination by the College of Surgeons of applicants for the Surgical Licentiate Degree, of 29 applicants, 13 were referred to their studies for periods of from three to nine months. With few exceptions, the English medical student is a young man of culture and intelligence. I think I am safe in saying a majority of them have taken a Bachelor's degree at some one of the universities. I hope to be able to furnish you something of more interest at some future time.

Fraternally,

P. H. MILLARD.

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*From Northwestern Lancet, January 1, 1882.

MEDICAL LAW*

A BILL TO REGULATE THE PRACTICE OF MEDICINE IN THE STATE OF MINNESOTA, TO LICENSE PHYSICIANS AND SURGEONS, AND TO PUNISH PERSONS VIOLATING THE PROVISIONS OF THIS ACT.

Be it Enacted by the Legislature of the State of Minnesota:

SECTION 1. The Governor of this State shall appoint a Board of Examiners, to be known as the State Board of Medical Examiners, consisting of nine (9) members, who shall hold office for three years after such appointment, and until their successors are appointed. Provided, that the members thereof first appointed under this act shall be divided into three classes, each class to consist of three, the first class shall hold office under said appointment for the period of one year, the second class for two years, and the third class for three years from the date of their appointment. It is further provided that no member thereof shall be appointed or serve for more than two terms in succession, and no member of any college or university having a Medical Department, shall be appointed to serve as a member of said Board. Two members of this board shall be homoeopaths.

SEC. 2. Said Board of Medical Examiners shall elect a President, Secretary and Treasurer; shall have and keep a common seal; the President and Secretary shall have the power to administer oaths. Said Board of Medical Examiners shall hold meetings for examinations, at the capitol of this State on the first Tuesday of January, April, July, and October of each year, and such other meetings as said Board may, from time to time, appoint. Said Board will keep a record of all the proceedings thereof, and also a record or register of all applicants for a license, together with his or her age, time spent in the study of medicine, and the name and location of all institutions granting to such applicants degrees or certificates of lectures in medicine or surgery; said register shall also show whether such applicant was rejected or licensed under this act. Said books and register shall be prima facie evidence of all the facts therein recorded.

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*From Northwestern Lancet, March 1, 1887.

Sec. 3. All persons hereafter commencing the practice of medicine and surgery, in any of its branches, in this State, shall apply to said Board for a license so to do, and such applicant, at the time and place designated by said Board, or at the regular meeting of said Board, shall submit to an examination in the following branches, to-wit: Anatomy, physiology, chemistry, histology, materia medica, therapeutics, preventive medicine, practice of medicine, surgery, obstetrics, diseases of women and children, diseases of the nervous system, diseases of the eye and ear, medical jurisprudence, and such other branches as the Board shall deem advisable, and present evidence of having taken three full courses of lectures of six months each. Said Board shall cause such examination to be both scientific and practical, but of sufficient severity to test the candidate's fitness to practise medicine and surgery. When desired, said examination shall be conducted in the presence of the Dean of any medical school, or some person designated by him, or the president of any medical society of this State. After examination, said Board shall grant a license to such applicants to practise medicine and surgery in the State of Minnesota, which said license can only be granted by the consent of not less than seven (7) members of said Board, and which said license shall be signed by the President and Secretary of said Board and attested by the seal thereof. The fee of such examination shall be the sum of ten ($10) dollars, and shall be paid by the applicant to the Treasurer of said Board, to be applied toward defraying the expenses thereof. Such Board may refuse or revoke a license for unprofessional, dishonorable, or immoral conduct. In all cases of refusal or revocation, the applicant may appeal to the appointing power of said Board.

Sec. 4. The person so receiving said license shall file the same or a certified copy thereof with the clerk of the district court, in and for the county where he or she resides, and said clerk of the court shall file said certificate or copy thereof and enter a memorandum thereof, giving the date of said license and name of the person to whom the same is issued, and the date of such filing in a book to be provided and kept for that purpose, and said clerk of the court shall each year furnish to the Secretary of said Board a list of all certificates on file in his office, and upon notice to him of the change of location or death of a person so licensed, or of the revocation of the license granted to such person, said clerk shall enter at the appropriate place in the record so kept by him, a memorandum of said fact, so that the record so kept by said clerk of the court shall correspond with the records of said Board, as kept by the Secretary thereof. In case a person so licensed shall move into another county of this State, he or she shall procure from the clerk of the court, a certified copy of said license and file the same with the clerk of the district court in the county to which he or she shall so remove; said clerk shall file and enter the same with like effect, as if the same was the original license.

Sec. 5. This act shall not apply to commissioned surgeons of the United States army or navy, to physicians and surgeons in actual consultation from other states and territories, or to actual medical students practising medicine under the direct supervision of a preceptor. Physicians whose practice extends into the territory of this State from an adjoining state or territory shall comply with the provisions of this act, and record their certificates with the clerk of the county in this State whose county seat is nearest the residence of such applicant.

Sec. 6. Any person practising medicine or surgery within this State without first having obtained the license herein provided for, or contrary to the provisions of this act, shall be deemed guilty of a misdemeanor, and upon conviction shall be fined not less than fifty nor more than one hundred dollars, or by imprisonment in the county jail not less than ten nor more than ninety days, or both fine and imprisonment. Any person shall be regarded as practicing within the meaning of this act, who shall append the letters M.D. or M.B. to his or her name, or, for a fee, prescribe or recommend for the use of any person, any drug, medicine or other agency for the treatment, cure or relief of any wound, fracture, or bodily injury, infirmity or disease. Justices of the peace, and the respective municipal courts, shall have jurisdiction over violations of the provisions of this act. It shall be the duty of the respective county attorneys to prosecute violations of this Act.

Sec. 7. Chapter 125 of the General Laws of 1883, is hereby repealed. It is, however, provided that all persons licensed under said act, and the Secretary of the Board herein provided for, shall enter the names of such persons upon the register so kept by him, as licensed physicians and surgeons, without application or fee upon the part of the person so licensed.

Sec. 8. This act shall take effect and be in force from and after July 1st, 1887.

THE NEW MEDICAL PRACTICE ACT*

We publish in this issue the new law regulating the practice of medicine in this State.

At the last meeting of the Minnesota State Medical Society, resolutions were unanimously passed requiring three courses of lectures of at least six months each as a prerequisite to the practice of medicine. In accordance therewith the new law recognizes no diploma, but requires an examination conducted by men not in any way connected with any school of medicine, and a certificate of such attendance.

After July 1st anyone wishing to practice in this State can do so only if he has fulfilled the conditions of the law.

That the law may cause complaint from some interested sources, we do not doubt, but that it is one for the general good is universally acknowledged.

Every school in Minnesota including the Homoeopathic, has carefully raised its standard to the requirements of the new law, and there are enough good schools outside of the State in which a student may acquire an education, that already comply in their curriculum with the law, to enable any honest student to practice here.

We shall be pleased to receive and publish any communications upon this subject.

*From Northwestern Lancet, March 1, 1887.

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MINNEAPOLIS, MINN., FEBRUARY, 1942

THE LEAVEN OF MEDICAL PROGRESS

Like Chinese ancestor worship, men of medicine in every clime from antiquity to the very last generation have revered the memory and recited the accomplishments of their predecessors in the healing art. This reverence has come about quite naturally because we are indebted to the past for our viewpoints today. Upon the sum total of past achievements rests our present practice of medicine.

But quite apart from the helpfulness of having certain truths established, facts based upon repeated observations, trial and error tests and laborious scientific research, another great benefit has been derived from this custom. A recitation of the adventurous paths trod by these forerunners in their search for truth has given encouragement to those who followed. It has served as a unique leaven that each generation of physicians has received, developed, and passed on. May this infusion never give out, and may its quality never deteriorate.

A. E. H.

SEVENTY-TWO YEARS OF SERVICE AND THE WAR

This Journal is celebrating the completion of nearly three-quarters of a century of service to humanity through medicine. The same year also marks the beginning for us of a new World War. For anyone who is not an intellectual hermit it is impossible to give thought long to any other problem without having the unfortunate question arise in one's mind as to the relation of what one is thinking about to the pressing problems of winning the War. Nevertheless it is important to remember that the only reason it is worth our while to fight is because we have a culture, a way of life, and a contribution worth fighting to protect and to perpetuate.

There is no intrinsic virtue in conflict, in spite of the pseudo-philosophical justification which recent and earlier proponents of the fascist ideology have tried to establish for it. Human life is an episode which has trial and pain enough without the addition of mass murder and the hardships and damage which accompany it in War. No physician who spends his hours, his days, his very life, alleviating pain and suffering can look with anything but mixtures of horror, disgust and sorrow on the spectacle we have before us today, of which we are now an active part.

There are some considerations which we as a profession should grasp in this time of trouble. This issue of the Journal-Lancet commemorates the Seventy-Second Anniversary of its founding. This Journal can be a symbol to us of what the American people are fighting for. This Journal has played a part, a significant part, in making American civilization what it is. It has served a whole region in supplying physicians with a means of contact with medical progress, with opportunities for publication of original contributions, and with stimulation both to practise better medicine themselves and to better practise generally. The standard of American life is measured by many yardsticks, but none is more important than the yardstick of health. The founding of this Journal and its publication over three generations has had an influence on the welfare of the great Mississippi Valley territory of which we can be certain without being able to measure it in any exact way. It is because we are certain of this contribution, and others like it, that we are resisting with our lives the threat to our national existence which confronts us today.

As a nation we are confident of ultimate victory. We expect and are prepared for sacrifice in "Blood, Sweat and Tears." Let us not forget that what we are fighting to preserve is our heritage and our opportunity to add to that legacy. In this time of crisis we must keep before ourselves the ultimate objectives, so that we may not sacrifice the very object of our struggle in the act of fighting. At any cost we must keep alive the worth-while institutions, of which this Journal is one, which have made American civilization what it is in the more significant areas. We can forego our pleasures, our entertainments and even our comforts as long as is necessary, but we cannot permit the instrumentalities of progress to die. If we do we are stultifying our effort. We shall be fighting for no purpose.

The years that are past have seen progress through much pain and trouble. We are starting on a period of trying times. But if we who bear the torch today are worthy of our trust, our successors will be able to look back with as much gratitude and pleasure to our contribution, as we do today to the contributions of those whose labor and loyalty over the last three-quarters of a century have made American Medicine what it is today.

M. B. V.

NATIONAL DEFENSE AND FIRST AID

Our country is at war. Our continent is preparing to defend itself. Our hospital superintendents are considering emergency cots to be placed in the halls when, as, and if, a catastrophe occurs.

From Boston and Seattle and from Minneapolis and New Orleans we have heard complaints about improper and inefficient splinting in the transportation of fractures of the long bones.

In Minnesota the 1941 session of the State Legislature passed a law which compels 2,875 school bus drivers in Minnesota to take a course in First Aid and learn to apply proper splints and carry prescribed equipment on school buses. The law is as follows:

CHAPTER 475

Session Laws of 1941. State of Minnesota

Section 1. Every school bus used within this state in the transportation of school children shall, when in service, carry as minimum equipment the following:

(a) "One First Aid Kit completely stocked according to the requirements of the State Department of Health.

(b) Two United States Army hinged ring upper extremity splints, or in lieu thereof, two splints for the upper extremity, approved by the State Department of Health.

(c) Two United States Army hinged half-ring lower extremity splints, or in lieu thereof, two lower extremity splints, approved by the State Department of Health."

(d) Two clean, heavy woolen blankets.

Section 2. Every school bus, when in service, shall be accompanied by at least one person who has acquired theoretical or practical knowledge in first aid, evidenced by a certificate issued to such person by the State Department of Health or by the *health officer of any municipality*.

Section 3. No person, firm, association or corporation shall operate any such school bus on the streets or highways of this state without first obtaining a permit therefor from the State Department of Health. Such certificate may be obtained from the said State Department of Health upon the furnishing of evidence satisfactory to the State Department of Health that the person seeking the permit has complied with the minimum standards set forth in this Act, and upon the payment of a fee of $1.00 at the time the initial application is made. Such permit shall be renewed annually upon the furnishing of evidence satisfactory to the said Department, that the holder thereof is complying with the minimum requirements of this Act and upon the payment of a renewal fee of $1.00.

Section 4. The provisions of this Act shall not apply to the rendering of a gratuitous service, or to buses operated within cities of the first class, as common carriers of passengers and licensed under the jurisdiction of the Railroad and Warehouse Commission, and which on certain occasions are used and operated as school buses, wholly within the limits of said cities.

Section 5. Nothing herein shall authorize any person, firm, association or corporation to engage in any manner in the practice of healing or the practice of medicine as defined by law.

Section 6. Every person, firm, association or corporation that violates any of the provisions of this Act shall be guilty of a misdemeanor.

A similar law was introduced making the same requirements for all ambulance drivers and all ambulances operated in Minnesota, but unfortunately public opinion was not strong enough and the bill was killed.

Public opinion is growing stronger daily. Medical schools are endeavoring to graduate physicians faster. Courses in the Surgery of Trauma are being given to undergraduates and to graduates. Sugar is being rationed and frosting is being eliminated.

The bombs may never drop on our inland cities, but the unexpected may happen. Let us get our state legislatures to pass laws and our city councils to pass ordinances requiring ambulance drivers and ambulances to meet at least the same requirements as the school bus drivers and school buses of Minnesota. Let us be ready.

"Time is short."

"Remember Pearl Harbor."

R. C. W.

Book Reviews

The Doctors Mayo, by H. B. Clapesattle. Minneapolis: University of Minnesota Press. $3.75.

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The Doctors Mayo is greater than its title suggests, going beyond the biographical scope of those three remarkable men—William Worrall Mayo, the father, and Will and Charlie, his sons—to become a warm and human story of nearly a century of medicine in Minnesota. The span dates from the crude and limited practice of the frontier doctor, who had yet to see the horizon of great achievements to come, to the present magnificent institutions which are dedicated to the advancement of medicine.

Perhaps 712 pages is a bit too much for the average reader, and the ramifications of the Mayo clinic structure may tangle the reader, but on the other hand the book is a compendium of everything one could wish to know about the Mayos. The anecdotes, whether old ones with a little more meat on their bones or new ones that contribute to livening the pages, alone recommend the book.

The author, Helen B. Clapesattle, who was commissioned to write this official biography by the University of Minnesota, has used the detached, objective approach of the historian that she is to place the Mayos in proper perspective with their own golden age.

She has also succeeded in tapping the secret of their success, perhaps almost unconsciously, in a few paragraphs, here and there in the book. They bear repeating:

"Then came the dawn of modern surgery, at a time when history was ready to accept it. Expanding transportation facilities made America a gypsy nation. Expanding wealth went to the many, not the few, and there was money for gadgets or health or saving.

"In Rochester, the tornado of 1883 was no ill wind, for it blew a hospital into being, the only one for miles around, and perhaps was the single major factor which accelerated the growth of a country-town into an international medical center.

"For (the Mayos) opportunity was golden, the advantages patent; they were heirs to one of the largest practices in the northwest, and allowing for the brief period necessary for the mantle to settle securely on their shoulders they could begin at a point it had taken a lifetime to attain.

"Continuity from father to sons was a fundamental factor in the rapid growth of the Mayos' practice.

"Will and Charlie had profited both from their father's teachings and practice, and their own skill with the knife at the dawn of modern surgery, as well.

"Around them, in southern Minnesota and adjacent states, a virgin growth of sickness awaited to be brought under control. Because they were the first with the new surgery they stood forth in a wide area as men who could heal where others failed.

"More and more sick folk sought them, and they gained more and more experience and skill. Then with unprecedented numbers to add to unusual results they made reports to their professional brethren that startled them into incredulous, then admiring attention. . . . And in the end it carried the name of Mayo to the farthest corner of the surgical world and made it known to more persons of the lay world than would recognize the name of any other medical man alive."

Proctology for the General Practitioner, by Frederick C. Smith, M.D., M.Sc.(Med.), F.A.P.S.; illustrated with 161 half-tones and line engravings and five color plates. Philadelphia: F. A. Davis Co., 1941. $4.50.

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In the second revised edition of this text Dr. Frederick C. Smith has given to the profession a well proportioned treatise on the diseases of the anus, rectum and colon. The book is intended to be used by medical students and general practitioners, and as such should serve its purpose admirably.

The chapter on Anesthesia is very comprehensive and informative. The author is very enthusiastic in his praise of diothane for local anesthesia, both as an anesthetising agent prior to surgery and for the relief of postoperative pain. His enthusiasm, which is no doubt due to his personal success with the drug, may build up an unwarranted degree of confidence in the minds of students and practitioners.

The author is very fair in his appraisal of the injection treatment of hemorrhoids and leaves no doubt in the minds of his readers that the treatment is not a cure-all method. The clamp and cautery method of removing hemorrhoids is described in detail and its virtues extolled. The statement is made that "the after results are entirely satisfactory." This statement would probably be challenged by many men doing rectal work who feel that this method should be referred to as an historic operation which has been replaced by more scientific surgical procedures.

The chapter on Parasites is complete and impresses the reader with the fact that this phase of the subject is worthy of considerable attention.

The physician who reads this book will do well to meditate on the words of the author who states that "pain often proves itself to be man's best friend." The patient who presents himself to the physician with the symptom of pain in the ano-rectal region or colon is entitled to a complete and painstaking investigation rather than to a prescription for a pill, suppository or salve for the temporary alleviation of the pain.

On the whole, the book is well written and should be warmly received by its readers.

Manual of Clinical Chemistry, by M. Reiner, M.A., Assistant Chemist, Mt. Sinai Hospital, N. Y.; Inter-science Publishers. $3.00.

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Marion Reiner's *Manual of Clinical Chemistry* includes procedures of current importance and interest as well as all routine procedures. This flexibly bound book should be of great value as a practical guide as well as for reference.

The methods appear to be as simple as possible, the language concise, and the procedures clear. No extraneous material having been included, the scope is surprisingly wide.

Interesting additions to this handbook are the chapters on sex hormones and vitamins and under "miscellaneous", for instance, are procedures for the analysis of urinary and biliary calculi with clearly stated technic.

All in all, Miss Reiner's *Manual* makes a valuable contribution to any clinical laboratory.

Premature Infant; Its Medical and Nursing Care, by Hess and Lundeen. 309 pages. Philadelphia: J. B. Lippincott Co., 1941. $3.50.

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Maternal death rates are falling satisfactorily in this country, but this is not true of infant deaths. It is the prematurely born child who prevents any further reduction in the death rate. Physicians and nurses have long needed more detailed information concerning the care of the premature infant, and now they may obtain it. The new book is complete in every way. It is based on many years of personal experiences of two authorities. The book gives one that confidence so necessary when you are called upon to be the guardian of the life of the small infant prematurely born.

Essentials of Endocrinology, by Arthur Grollman. 480 pages. Philadelphia: J. B. Lippincott Co., 1941. $7.00.

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This work, by one of Johns Hopkins' outstanding men, is rather a complete book on all the diseases of endocrine origin. It discusses the anatomy, physiology, and pharmacology of the various hormones known to modern medicine. Of course, it spends considerable time detailing the clinical picture as well as the treatment of various diseases of endocrine origin. When one considers the amount of work that is included in this book, one may be surprised that it is all contained in 480 pages, but the conciseness of style and the exactness of description have conserved words.

Synopsis of Diseases of the Heart and Arteries, by G. R. Herrmann; second edition. St. Louis: C. V. Mosby Co., 468 pages. $5.00.

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This textbook is one of the most compact and complete books available on the subject today. In its 468 pages it covers the entire field of circulatory and cardiac disease in a most concise form. The reviewer feels it is to be highly recommended to anyone who has occasion to handle circulatory and cardiac disease. All subjects are classified under individual headings and their treatment is outlined in concise, readily understandable form. The reviewer feels that this book is to be highly recommended inasmuch as among its other features are explanations of the electrocardiograph and its use, and also of radiography in the diagnosis of heart disease.

Infantile Paralysis (Anterior Poliomyelitis), by Philip Lewin, M.D., Associate Professor of Bone and Joint Surgery, Northwestern University Medical School. 372 pages with 165 illustrations; Philadelphia: W. B. Saunders Co., 1941. $6.00.

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This monograph is a most comprehensive review of the newer knowledge of anterior poliomyelitis, based on a complete examination of the current literature and the author's personal experiences. There are chapters on etiology, mode of infection, immunity, epidemiology, and pathology in the way of an introduction. These are followed by treatment including a good presentation of the symptomatology and diagnosis of infantile paralysis. Special emphasis is placed on the medical treatment and such new forms of treatment as the Kenny Method are outlined. There are also chapters on the surgical treatment of poliomyelitis.

Arthritis in Modern Practice: The Diagnosis and Management of Rheumatic and Allied Conditions, by Otto Steinbrocker, B.S., M.D., Assistant Attending Physician and Chief, Arthritis Clinic, Bellevue Hospital, Fourth Medical Division, New York City. 606 pages; Philadelphia: W. B. Saunders Co., 1941. $8.00.

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The author has used essentially the grouping advocated by the American Rheumatism Association, has analyzed well the material in a large out-patient and hospital service, and makes very practical use of the most modern methods of approach to the complicated problems in this field. He has written with a view particularly to the needs of the practitioner in medicine and has given in concise and practical form readily available, the commonly accepted diagnostic and therapeutic measures and those procedures which are proving useful but are too new to have found a place in the textbooks.

Very useful chapters are found on the Painful Shoulder, Backache, Sciatica, and on Local and Regional Analgesic Injections. The statement that prolapsed or displaced intervertebral disks have been found to cause less than two per cent of low backache, including sciatica, will not meet with agreement by all, but illustrates the definitely conservative and worthwhile approach. Gold salt therapy in rheumatoid arthritis is given adequate consideration and as with the subjects of focal infections and vaccines, the attitude is thoroughly sound. A few very minor criticisms do not detract one whit from the value of this work to every practitioner who desires to care for any or all of the maladies grouped herein.

SIXTEENTH ANNUAL MEETING

NATIONAL CONFERENCE ON MEDICAL SERVICE

(Formerly the Northwest Regional Conference)

Sunday, February 15, 1942

Palmer House, Chicago, Illinois

PROGRAM

9:00 A. M.—REGISTRATION.

9:30 A. M.—1. *The Relation of the Physician to Military, Civilian and Industrial Health*

- (1) Procurement and Assignment of Physicians for Military Service—Sam F. Seeley, M.D., Executive Officer, Procurement and Assignment Service, Washington, D. C.
- (2) Civilian Defense
  - (a) Civilian, (b) Hospitals, (c) Emergency Medical Squads—Graham L. Davis, Hospital Consultant, W. K. Kellogg Foundation, Battle Creek, Mich.
- (3) Industry's Problem in Maintaining Adequate Medical Care
  - (a) Non-Defense Projects—John R. Nilsson, M.D., Chief Surgeon, Union Pacific Railroad, Omaha, Neb. (tentative).
  - (b) National Defense Projects—W. D. Norwood, M.D., Medical Director, DuPont Company, Elwood Ordnance Plant, Joliet, Ill. (tentative).

11:30 A. M.—2. *The Role of the State Medical Society and State and City Departments of Health in National Defense*

- (1) State Medical Society—W. P. Wherry, M.D., President Nebraska State Medical Society, Omaha, Neb.
- (2) State Department of Health—W. L. Bierring, M.D., State Health Officer of Iowa, Des Moines, Ia. (tentative).
- (3) City Department of Health—Herman N. Bundesen, M.D., President, Board of Health, Chicago, Ill.

12:15 P. M.—DINNER.

1:30 P. M.—3. PRESIDENT'S ADDRESS — Harold M. Camp, M.D., Monmouth, Ill.

1:45 P. M.—4. REPORT OF NOMINATING COMMITTEE; ANNUAL ELECTION OF OFFICERS; SELECTION OF PLACE FOR 1943 MEETING.

2:00 P. M.—5. *Rejected Selectees and Their Rehabilitation for Active Military Service*

- (1) Local and Induction Board Examinations—Samuel J. Kopetzky, M.D., New York City (tentative).
- (2) One Million Rejected; What Percent May Be Salvaged?
  - (a) By Personal Physician or Dentist Prior to Induction—George Baehr, M.D., New York City (tentative); J. R. Blayney, D.D.S., Chicago, Ill.
  - (b) Following Induction—L. D. Redway, M.D., Ossining, N. Y. (tentative).

3:30 P. M.—6. *The Role of the Medical, Dental, Nursing Schools and Hospitals in Anticipating the Acceleration of Training*

- (1) The Need for a Trained Personnel to Care for the Health of the Military—J. R. Darnall, M.D., Lt. Col., Medical Corps, Washington, D. C.
- (2) Status of Pre-Medic, Medic and Dental Students, Internships and Residencies During the Emergency—Leonard Rowntree, M.D., Chief, Medical Division, Selective Service System, Washington, D. C. (tentative).
- (3) What the Medical, Dental and Nursing Schools May Do To Hasten the Graduation of Their Respective Students — Fred C. Zapffe, M.D., Chicago, Ill. (tentative).

TRANSACTIONS OF
THE MINNEAPOLIS ACADEMY OF MEDICINE

Founded January 17, 1920

Stated Meeting Held at the Minneapolis Club, Thursday, November 13, 1941
The President, Malcolm B. Hanson, M.D., in the chair

UNUSUAL CASES OF PULMONARY FIBROSIS, PROBABLY OF ALLERGIC ORIGIN

R. S. Ylvisaker, M.D.

I will be very brief. I have two cases that I thought were worth reporting as they are quite interesting. One is a woman in her early forties who consulted us with a complaint of progressively increasing cough and dyspnea over a period of two years. When she came in she was extremely cyanotic and had a great deal of difficulty in breathing, a constant thing, not a paroxysmal type of dyspnea.

On X-ray examination she presented this rather interesting picture, (showed slide). We interpreted this as a chronic type of pulmonary fibrosis of non-specific character and our prognosis in the case was quite guarded, to say the least. She went on for several months on supportive treatment, did not improve and so became discouraged and asked for someone else's opinion. She was therefore seen by one of the medical men at the Mayo Clinic and he made the same diagnosis of a chronic non-specific type of pulmonary fibrosis and gave us a definitely bad prognosis.

She then returned to us and several things were done. We started her on an autogenous type of streptococcus vaccine. This was given for a period of several months at five- to seven-day intervals. She was also given a course of deep X-ray therapy to her lungs. Shortly after this she spent several weeks in California. Much to our surprise when she returned a little later this process had practically entirely cleared up.

It is very interesting to see how completely a process which had been thought to be chronic could clear up in a comparatively short time. Peculiarly enough, this patient finally developed a true bronchial asthma.

Just after we saw this case a boy in his early twenties came in with a shorter history of about one year's duration, gradually increasing cough, dyspnea, with nasal polyps. Although not as far advanced a condition, he showed a somewhat similar type of picture on the X-ray examination. The appearance is that of a more acute condition but in his case also we were forced to make a diagnosis of a beginning chronic pulmonary fibrosis. He, likewise, in a period of two or three months cleared up completely.

This boy was allergic to many things but showed no improvement until he was started on an autogenous streptococcus vaccine, when he showed a prompt improvement. He, too, has developed a typical bronchial asthma.

STAPHYLOCOCCUS SEPTICEMIA

A case of staphylococcus septicemia was presented by Dr. Jay C. Davis, discussed by Dr. Wesley W. Spink (by invitation). A complete report of this case will be published at a later date.

Discussion

C. A. McKinlay, M.D.: The case referred to by Dr. Spink in his discussion might be briefly reviewed as an instance in which the ultimate recovery in spite of extreme illness and complication would suggest encouragement to Dr. Davis.

In a male student aged 25 years, an abscess developed over the left shoulder region. On admission to the University Hospital two days later, he had high fever, marked prostration, marked staphylococcus septicemia with numerous colonies in the plates from the blood culture. Early in the course of disease, physical and X-ray findings of pneumonia developed with multiple shadows in the right and left lung fields. Sulfathiozol therapy was immediately started by Dr. Boehrer in collaboration with Dr. Spink and effective levels quickly established in the blood which became sterile on culture within two or three days and remained so throughout the course of illness. During the next few weeks the story was that of continuing septic temperature with the development of multiple lung abscesses, empyema and possible posterior mediastinal effusion. During this stage chemotherapy showed its ineffectiveness in combating localized and encapsulated pus pockets and at this time general supportive treatment and blood transfusions saved the day until and when localization and drainage of pus accumulations was accomplished by the surgeon, Dr. Fowler.

Chemotherapy saved this individual from destruction by septicemia and made possible the supportive treatment and drainage of abscesses. All three phases of treatment, chemotherapy, supportive and surgical, were essential to the recovery of this patient about three months after onset of illness.

Before the era of chemotherapy, of eight cases of septicemia (chiefly staphylococcic) recalled, the only recovery noted was in one instance with osteomyelitis surgically treated by Dr. Evans. This is in keeping with general experience that those patients who survive the initial blood stream invasion and develop local areas or areas of suppuration have greater chance for ultimate recovery.

T. J. Kinsella, M.D.: This case presents several points which are of interest. First of all, pleural effusions resulting from staphylococcus and pneumococcus infection which usually become thick and purulent within a short period of time, as a rule a week or ten days, may under intensive chemotherapy remain clear, thin and serous for several weeks and show no bacteria on smear or culture. This should enable us by repeated aspiration to bring about expansion of the lung and obliteration of the pleural pocket before suppuration occurs. This clear pleural effusion has a high fibrin content and frequently coagulates as soon as it is removed from the chest. Deposit of fibrin coagulum likewise occurs within the pleura causing pocketing of the effusion. I believe that following chemotherapy we see more multilocular empyemas than without it. Following discontinuation of chemotherapy any residual bacteria may resume activity and cause a purulent effusion which must then be drained. Chemotherapy will not replace surgical drainage once an abscess has formed. In this patient we were confronted with multiple bilateral pocketed pleural effusions, some of which were obliterated by aspiration, others became purulent and required surgical drainage.

The rib resection for the drainage of the interlobar effusion in this patient was done at a time when he had a marked leucopenia and almost no granulocytes in his circulating blood. The wound remained gray, dull and lustreless, was very indolent in appearance with absolutely no exudate until his leucocytes began to increase in the blood stream. The wound then became pink and purulent exudate began to appear.

The problem of the discovery, localization and drainage of these various accumulations have made this case extremely interesting and instructive.

L. R. Boies, M.D.: It is now my belief that this patient first had a thrombophlebitis of veins in the left orbit. We expected a cavernous sinus thrombosis to develop when there occurred edema of his lids, a gradual proptosis, fixation, chemosis of the conjunctiva, etc. Then the gradual and almost complete disappearance of these signs was difficult to explain. When the proptosis and chemosis recurred but along with a general improvement in his toxic appearance and the fever, an abscess of the orbit was considered. Dr. Davis wondered about the possibilities of the sinuses as a focus for this orbital condition. At no time had there been any clinical evidence of sinusitis. The X-rays of the sinuses were negative.

We now know that he has a small abscess apparently localized and draining through a small fistula made at the site where it pointed through the medial half of the lower lid. I believe more certain drainage is needed, but feel confident that this patient will recover as far as this orbital abscess is concerned.

TREATMENT OF SCOLIOSIS

Myron O. Henry, M.D.

Scoliosis is considered a dull subject by many of us, and I shall not take much of your time reviewing treatment of it tonight. Most of you think of braces, and perhaps a cast, when a scoliotic comes into your office; and some of you wish he had gone to someone else. This attitude should now change, because we have made a lot of progress in treatment of this condition since the beginning of the spinal fusion operations, and particularly since the popularization of my chip-graft method of fusion. I have a few lantern slides to illustrate various points.

Most of these cases seem to be girls, the first case being a girl of 12 when treatment was started. We suspended her in a Sayre sling and applied plaster-of-Parish jackets every three months for a year without much improvement after the first cast. The major curve was then fused by the chip-graft method, and solid fusion is seen one year later. X-rays taken two years postoperative show that the strength of the fusion and the new bone formation has increased, and that the curvature has remained stationary.

The next case is a girl of 14, and is selected to show that successive jackets in suspension may stop further curvature, but do not correct the curvature a great deal after the first cast. This case also was fused, and X-rays taken ten years after the fusion show that there has been no further increase in deformity, nor has the fusion interfered with growth.

The next case is a severe structural scoliosis in a woman of 35 with a severe lumbar list, who also had narrowing of the last intervertebral disc, and a severe sciatica. She was fused to relieve the sciatica (this was before the popularization of the protruded disc operation) and she gained a very firm fusion and was entirely relieved of her sciatica.

The next patient is a woman of 21, and the X-ray shown is three months postoperative. The next X-ray is one year later, showing that the bone of the fusion itself increases in strength and thickness. This case is also interesting because of the excellent cosmetic result of the operation, which has allowed the patient to continue her profession of modeling.

The next case is a girl of 14, who secured a good fusion, became interested in nursing, took her training, and is now a nursing supervisor. The X-rays show increasing strength in the fused portion, and no interference with growth.

Dr. LeMesurier, of Toronto, has made a real contribution to the treatment of scoliosis during the past year. Instead of Sayre sling, Abbott frame, Galiazzi derotation machine, or Risser jacket, he suspended his patients on their sides. The patients are slung up in a fish-net with the concave side of the curvature dependant. The arm and leg on the convex side are supported without traction. The arm on the concave side projects through a hole in the net. The patient is put up in this net for increasing periods of time each day until she can stand the corrected position for one hour. The correction is checked by portable X-ray, as this slide shows. A plaster-of-Paris cast is then applied over the net, including the high leg and the cervical spine and head, as this slide shows. A window is cut in the back of this spica-jacket cast, and through this the usual chip-graft fusion operation is done. The only danger of this method is of stretching the brachial plexus by too much curvature of the neck. The next slide shows the amazing amount of correction gained by suspension in the LeMesurier net and held under control in the spica-jacket. The next slide shows the spine three months after operation; it is well fused.

By this method it is possible to correct simple curves in older people, as this slide shows. This patient is a woman of 41, with a curve in the lumbar region without much rotation. The next X-ray shows the nice correction gained in the LeMesurier method of suspension.

Conclusions:

1. Much progress has been made in the treatment of scoliosis since the popularization of spinal fusion operations, especially the chip-graft method.
2. Spinal fusion operations hold the correction gained up to the time of operation, do not interfere with growth, and increase in strength as the patient grows older.
3. The LeMesurier method of correction by lateral suspension is a real advance in the treatment; it broadens the application of the fusion operation, and gains greater correction than any other method.

Discussion

O. J. Campbell, M.D.: When such fusions are done in the young individual, do you know whether the growth of the spine is interfered with?

M. O. Henry, M.D.: Here is a girl at age 14 and again at 24. The fusion operation has not interfered with the growth of the spine, nor changed the degree of curvature a single bit. This is one of the first chip-graft fusions, by the way, by my method done in 1926. There were a lot of vertebrae fused, starting with the first lumbar and going up about to the first dorsal. The spine has continued to grow even though it is fused.

Kodachrome motion pictures, Kodiak Bear Hunting, were shown by Dr. Elmer M. Rusten.

Ernest R. Anderson, M.D., *Secretary.*

RECOMMENDATIONS TO ALL PHYSICIANS WITH REFERENCE TO THE NATIONAL EMERGENCY

I. Medical Students

A. All students holding letters of acceptance from the Dean for admission to medical colleges and freshmen and sophomores of good academic standing in medical colleges should present letters or have letters presented for them by their deans to their local boards of the Selective Service System. This step is necessary in order to be considered for deferment in Class II-A as a medical student. If local boards classify such students in Class I-A, they should immediately notify their deans and if necessary exercise their rights of appeal to the Board of Appeals. If, after exhausting such rights of appeal, further consideration is necessary, request for further appeal may be made to the State Director and if necessary to the National Director of the Selective Service System. These officers have the power to take appeals to the President.

B. Those junior and senior students who are disqualified physically for commissions are to be recommended for deferment to local boards by their deans. These students should enroll with the Procurement and Assignment Service for other assignment.

C. All junior and senior students in good standing in medical schools, who have not done so, should apply immediately for commission in the Army or the Navy. This commission is in the grade of Second Lieutenant, Medical Administrative Corps of the Army of the United States, or Ensign H. V. (P) of the United States Navy Reserve, the choice as to Army or Navy being entirely voluntary. Applications for commission in the Army should be made to the Corps Area Surgeon of the Corps Area in which the applicant resides and applications for commission in the Navy should be made to the Commandant of the Naval District in which the applicant resides. Medical R.O.T.C. students should continue as before with a view of obtaining commissions as First Lieutenants, Medical Corps, upon graduation. Students who hold commissions, while the commissions are in force, come under the jurisdiction of the Army and Navy authorities and are not subject to induction under the Selective Service Act. The Army and Navy authorities will defer calling these officers to active duty until they have completed their medical education and at least 12 months of interneship.

II. Recent Graduates

Upon successful completion of the medical college course, every individual holding commission as a Second Lieutenant, Medical Administrative Corps, Army of the United States, should make immediate application to the Adjutant General, United States Army, Washington, D. C., for appointment as First Lieutenant, Medical Corps, Army of the United States. Every individual holding commission as Ensign H.V. (P), U. S. Navy Reserve, should make immediate application to the Commandant of his Naval District for commission as Lieutenant (J.G.) Medical Corps Reserve, U. S. Navy. If appointment is desired in the grade of Lieutenant, (J.G.) in the regular Medical Corps of the U. S. Navy, application should be made to the Bureau of Medicine and Surgery, Navy Department, Washington, D. C.

Graduates who have failed to obtain a Medical Administrative Corps or Ensign Commission run the risk of being inducted into the military service as enlisted men under the provisions of the Selective Service Acts.

III. Twelve Months Internes

All internes should apply for a commission as First Lieutenant, Medical Corps, Army of the United States, or as Lieutenant (J.G.), United States Navy or Navy Reserve. Upon completion of 12 months interneship, except in rare instances where the necessity of continuation as a member of the staff or as a resident can be defended by the institution, all who are physically fit may be required to enter military service. Those commissioned may then expect to enter military service in their professional capacity as medical officers; those who failed to apply for commission are liable for military service under the Selective Service Acts.

IV. Hospital Staff Members

Internes with more than 12 months of interneship, assistant residents, fellows, residents, junior staff members, and staff members under the age of 45, fall within the provisions of the Selective Service Acts which provide that all men between the ages of 20 and 45 are liable for military service. All such men holding Army commissions are subject to call at any time and only *temporary deferment* is possible, upon approval of the application made by the institution to the Adjutant General of the United States Army certifying that the individual is temporarily indispensable. All such men holding Naval Reserve commissions are subject to call at any time at the discretion of the Secretary of the Navy. Temporary deferments may be granted only upon approval of applications made to the Surgeon General of the Navy.

All men in this category who do not hold commissions should enroll with the Procurement and Assignment Service. The Procurement and Assignment Service under the Executive Order of the President is charged with the proper distribution of medical personnel for military, governmental, industrial, and civil agencies of the entire country. All those so enrolled whose services have not been established as essential in their present capacities will be certified as available to the Army, Navy, governmental, industrial, or civil agencies requiring their services for the duration of the war.

V. All Physicians Under Forty-Five

All male physicians in this category are liable for military service and those who do not hold commissions are subject to induction under the Selective Service Acts. In order that their service may be utilized in a professional capacity as medical officers, they should be made available for service when needed. Wherever possible, their present positions in civil life should be filled or provisions made for filling their positions, by those who are (a) over 45, (b) physicians under 45 who are physically disqualified for military service, (c) women physicians, and (d) instructors and those engaged in research who do not possess an M.D. degree whose utilization would make available a physician for military service.

Every physician in this age group will be asked to enroll at an early date with the Procurement and Assignment Service. He will be certified for a position commensurate with his professional training and experience as requisitions are placed with the Procurement and Assignment Service by military, governmental, industrial or civil agencies requiring the assistance of those who must be dislocated for the duration of the national emergency.

VI. All Physicians Over Forty-Five

All physicians over 45 will be asked to enroll with the Procurement and Assignment Service at an early date. Those who are essential in their present capacities will be retained and those who are available for assignment to military, governmental, industrial or civil agencies may be asked by the Procurement and Assignment Service to serve those Agencies.

The maximal age for original appointment in the Army of the United States is 55. The maximal age for original appointment in the Naval Reserve is 50 years of age.

All inquiries concerning The Procurement and Assignment Service should be sent to The Executive Officer, 5654 Social Security Building, 4th and Independence Avenues, SW., Washington, D. C., and not to individual members of the Directing Board or of committees thereof.

News Items

Dr. J. A. Muggly, Madison, South Dakota, was named president of the Third District Medical society at the quarterly meeting of the society held in Brookings. Other officers are: Dr. E. H. Grove, Arlington, vice-president; Dr. D. S. Baughman, secretary-treasurer; Dr. George Whitson, delegate to the state association; and Dr. Harold Miller, Brookings, censor.

University of Minnesota regents have approved a plan to enlarge enrollment in the medical school and shorten the course to three calendar years. First-year medical students who normally would enter the school in the fall will start instead in June, at the close of spring quarter. In addition, they will work straight through all summer vacation, thus cutting the course to three years.

Dr. D. V. Boardman, Twin Valley, Minnesota, is now president of the Red River Valley Medical society. Dr. A. S. Berlin, Hallock, Minnesota, is the new vice-president.

Dr. Lawrence G. Pray is succeeding his brother, Dr. R. E. Pray as pediatrician at the Fargo Clinic, Fargo, North Dakota. Dr. R. E. Pray left Fargo several months ago to engage in private practice at Salinas, California. Dr. Lawrence Pray comes to Fargo from Washington. He spent six years at Johns Hopkins university and the medical school of Columbia university, specializing in pediatrics.

Dr. C. H. Nelson, Billings, has been reappointed to the Montana state board of medical examiners; his new term will expire January 1, 1949. The appointment was made by Governor Sam C. Ford.

Dr. Howard F. Claydon who practiced in Zumbrota, Minnesota, since 1930, is now associated with his father, Dr. L. E. Claydon, in the Claydon Clinic, Red Wing, Minnesota. Dr. Leon A. Schafer will take over Dr. Claydon's practice in Zumbrota.

Dr. O. F. Mellby, Thief River Falls, was recently honored in recognition of his 25 years of service as the Pennington county member and chairman of the Oakland Park sanatorium commission.

Dr. F. E. Savage, Butte, Montana, was re-elected president of the Butte Auxiliary for the Rehabilitation of Crippled Children at the election meeting of the group recently.

Dr. A. Banngenstoss, a native of Richardton, North Dakota, has left the Mayo clinic, Rochester, Minnesota, to accept an assignment in a naval hospital in California.

Dr. E. M. Howg, formerly of Sioux Falls, South Dakota, is now practicing in Barrett, Minnesota.

Dr. J. M. Nelson has been appointed Missoula county physician for 1942 by unanimous vote of the county commissioners. He succeeds Dr. J. J. Flynn.

Dr. A. C. Bart, Fargo, North Dakota, has been reappointed Cass county physician by the county board of commissioners. He was first appointed in 1941 to fill the vacancy caused by resignation of Dr. Donald Peterson.

The 1942 convention of the North Dakota State Medical association will be held at Jamestown, May 18, 19 and 20, it was decided at a meeting of the Stutsman county host group meeting in Grafton recently.

Dr. Robert B. Radl has been re-ordered into full-time Army duty as medical officer at the North Dakota State Headquarters of Selective Service, Fraine Barracks, Bismarck. On December 1. Dr. Radl had been released from his full time duties but due to the increased medical work since the onset of war, he was recalled on December 26.

Dr. T. J. Bloedel has returned to Minneapolis from New Richland, Minnesota, and has formed a partnership with Dr. Philip Anderson.

Dr. Olaf Haraldson, Minot, North Dakota, has been appointed Ward county health officer. Dr. A. Donnelly, Kenmare, chairman of the board of commissioners, made the announcement. The Minot physician succeeds Dr. J. Wilbure Moreland of Carpio.

Dr. F. J. Hill, North Dakota State health department epidemiologist, has been named acting state health officer to succeed Dr. Maysil M. Williams who has accepted a position with the New York City health department.

Dr. H. M. Teel, Polson, Montana, was elected chairman of the subcommittee on medical care, nursing and other phases of doctoring for emergencies, at the meeting of the medical association of Lake county.

Dr. Joseph Murphy who recently completed his internship at the University hospital, has opened an office in Marshall, Minnesota.

Dr. W. L. Wallbank, senior resident physician of the state tuberculosis sanatorium at San Haven, North Dakota, for the past three years, has been named superintendent by the state board of administration. He succeeds Dr. Cedric Northrop.

Dr. Ole M. Heiberg, Manhattan, Kansas, has succeeded Dr. I. H. Wilson on the staff of the Worthington clinic, Worthington, Minnesota. Dr. Wilson has been called into military service.

Dr. H. G. Rice, Moorhead, was elected president of the Clay-Becker Medical association at the meeting held recently. Dr. O. O. Larson, Detroit Lakes, is the vice-president and Dr. E. K. Ingebrigtson, Moorhead, secretary.

President Roosevelt has appointed Dr. George Baehr, Chief Medical Officer of the Office of Civilian Defense, to be a member of the Health and Medical Committee of the Office of Defense Health and Welfare Services. Dr. Irvin Abell, Louisville, Kentucky, chairman of the Committee on Medical Preparedness of the American Medical Association, is chairman of the Health and Medical Committee and other members are the Surgeon General of the U. S. Army, Major General James C.

Magee; the Surgeon General of the U. S. Navy, Rear Admiral Ross T. McIntire; the Surgeon General of the U. S. Public Health Service, Dr. Thomas Parran, and the chairman of the Division of Medical Sciences, National Research Council, Dr. Lewis W. Weed, Baltimore. The office of Defense Health and Welfare Services is a part of the Office for Emergency Management which in turn is part of the Executive Office of the President. The director of the ODHWS is Paul V. McNutt, who is also Federal Security Administrator.

Dr. Frank S. Ashburn, a fellow in surgery at the Mayo Foundation, Rochester, Minnesota, and a lieutenant (junior grade) in the Naval Reserve, has been called to active duty in the Navy, Eighth Naval District Headquarters has announced. He was graduated from the University of Texas Medical College at Galveston in 1938, and served as an intern at the Ancker hospital, St. Paul, Minn., in 1938-39, and was a resident fellow in medicine at the University of Minnesota in 1939-40, when he went to the Mayo Clinic as a fellow in surgery.

The American Association of Industrial Physicians and Surgeons, and the American Industrial Hygiene Association will hold their joint Annual Convention in Cincinnati from April 13 to 17, 1942. A program is in preparation in which important medical and hygienic problems associated with the present huge task of American industry will be presented and discussed in clinics, lectures, symposia, and scientific exhibits. The central purpose of the meeting will be to provide a five-day institute for the interchange and dissemination of information on new problems as well as for the consideration of up-to-date methods of dealing with those that are well known. The industrial physicians have taken responsibility for the program of the first two and one-half days and the hygienists for the remainder of the five days.

The Minnesota State Medical Association broadcasts weekly at 10:45 o'clock every Saturday morning over Station WCCO, Minneapolis, Station WLB, University of Minnesota, and KDAL, Duluth. Speaker: William A. O'Brien, M.D., Director of Postgraduate Medical Education, Medical School, University of Minnesota. February 7—Hemorrhage and Shock; February 14—First Aid in Fractures; February 21—Treatment of Wounds; February 28—Injuries of Jaw and Teeth.

The partnership of Drs. George T. Ayres and Owen W. Parker of Ely, Minnesota, which was begun in 1908 was dissolved on January 1, 1942. Dr. Parker retired from practice and his interest in the firm was taken over by Dr. Harry N. Sutherland.

Eight physicians were licensed to practice medicine in the state of North Dakota as a result of examinations by the state board of medical examiners held in Grand Forks recently. The new doctors are: Omar Decker, Finley; Gerald Ahern, Bismarck; Oral Stone, Bottineau; Bernice Brown, Grand Forks; Laurence Pray, Fargo; Gordon Abbot, Minot; Robert Fawcett, Rochester, Minnesota; and Kenneth Fritzell, Minneapolis, Minnesota.

The Medical Division of the U. S. Office of Civilian Defense has issued the second bulletin of its official series of instructions for emergency medical care of the civilian population in war emergencies, "Equipment and Operation of Emergency Medical Field Units." The bulletin explains the duties of local chiefs of Emergency Medical Service, describes the operation of Casualty Stations and First Aid Posts and lists the minimum equipment for Emergency Medical Field Units, organization of which was described in the first bulletin, "Emergency Medical Service for Civilian Defense," issued in August, 1941. The Office of Civilian Defense recommends that all defense councils adopt the plans as set forth in these bulletins. Uniformity will make it possible for adjacent communities to pool or exchange their resources, and it is also desirable because of priorities in materials and manufactures. All equipment recommended conforms with that of the Medical Department of the U. S. Army, the bulletin points out. The field casualty service projected by the Medical Division of the Office of Civilian Defense will be made up of Emergency Medical Field Units derived from hospitals in the community. These units will work in Casualty Stations set up at a predetermined site some distance from the scene of a disaster. The Casualty Stations will care for persons with minor injuries and those suffering from nervous shock or hysteria until they may return to their homes or to temporary shelters. An important part of the work of these stations will be to keep records of patients treated.

The Second American Congress on Obstetrics and Gynecology will be held in St. Louis, April 6th to 10th. During the war there is certain to be a tremendous shift in medical and nursing services from civil to military duties. The Congress will therefore give attention to this problem and over two hundred experts have already agreed to take part in the general program. There will be innovations such as a series of "Obstetric Information Please" Round Tables; Mannikin Demonstrations of Forceps and Breech in multiple and small groups; and Personal Consultation Service throughout the week by appointment. The medical, health, nursing, educational and administrative sections are all to have programs of special and timely interest and importance.

The Secretary of the Navy recently approved a change in Navy regulations whereby it is now possible for those pre-medical students who have been accepted for entrance to, and all medical students in, Class "A" medical colleges, to be appointed in the United States Naval Reserve in Class H-V(P), provided they meet the physical and other requirements for such appointment. Students who are acceptable will be given provisional commissions as Ensigns, and it is the policy of the Bureau of Medicine and Surgery not to nominate such officers for active duty until after they have completed their prescribed medical studies and shall have served one year's satisfactory internship in a civilian hospital accredited for interne training, or shall have been accepted as Acting Assistant Surgeon in the Navy for interne training.

(Continued on page 74)

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NEWS ITEMS (Continued from page 72)

Upon graduation, and when the bureau has been informed of this fact by the Dean, commissions as Lieutenant (junior grade) MC-V(G), USNR, will be issued to provisional Ensigns and, after serving their internship in non-naval hospitals, they will be nominated for active duty. Application for, or acceptance of either a provisional or permanent commission in the Naval Reserve, does not preclude the possibility of applying for a commission in the Medical Corps of the regular Navy. Persons affiliated with the Naval Reserve are not subject to induction into Army service by action of local Selective Service Boards.

Navy regulations require that all applications for appointments in the Naval Reserve be filed with the Commandant of the Naval District in which the applicant resides.

Application forms may be obtained from the Dean's office or from someone designated by him, upon request from the Bureau of Medicine and Surgery, Navy Department, Washington, D. C., or from the Commandant of your Naval District.

In the case of a pre-medical student, it is necessary to enclose with your application a statement, signed by the Dean of a medical college, to the effect you have been accepted as a first year medical student in a Class "A" school for the next entering class.

It is the understanding of the Bureau of Medicine and Surgery that Selective Service Boards will accept a statement from the Commandant of your Naval District to the effect that your application is on file, as basis for deferment until your application has received final action.

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FRACTURES & TRAUMATIC SURGERY—Two Weeks Intensive Course will be offered starting March 9th. Informal Course available every week.

GYNECOLOGY—Two Weeks Intensive Course will be offered starting April 6th. Clinical and Diagnostic Courses every week.

OBSTETRICS—Two Weeks Intensive Course will be offered starting April 20th. Informal Course every week.

OTOLARYNGOLOGY—Two Weeks Intensive Course will be offered starting April 6th. Clinical and Special Courses starting every week.

OPHTHALMOLOGY—Two Weeks Intensive Course will be offered starting April 20th. Five Weeks Course in Refraction Methods starting March 9th. Informal Course every week.

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The
JOURNAL
LANCET

Minneapolis, Minnesota
March, 1942

Vol. LXII. No. 3
New Series

Atypical Pneumonia Associated with Rheumatic Endocarditis*

C. A. McKinlay, M.D.
E. H. Lange, M.D.
J. J. Boehrer, M.D.
Minneapolis, Minnesota

IN a recent fatal case of atypical pneumonia, postmortem examination revealed rheumatic endocarditis and a widespread pneumonia characterized by scattered areas of consolidation some resembling grey and others red hepatization. Microscopically there were miliary areas of bronchopneumonia with monocytic infiltration in the bronchial wall extending into the parenchyma; the lesion was interpreted pathologically[1] to be consistent with the rheumatic process. In retrospect this case related itself to another seen in recent months in which in a young adult male atypical pneumonia and rheumatic endocarditis appeared coincidently.

Atypical pneumonia of unknown etiology has been emphasized in recent clinical reports.[2,3,4,5,6,7,8] The course of disease has tended to be protracted; the fatality rate has been low and termination has commonly been by lysis. The physical signs have been minimal and sometimes retarded in their appearance. The lesion has sometimes had widespread distribution throughout the lung fields. Radiologically there have been diffuse, sometimes mottled lung shadows, sometimes coalesent in one or more areas, not infrequently described by the radiologist as miliary in character. The leucocyte counts have usually been normal or reduced and blood cultures have shown no growth. Rusty sputum has usually not appeared. In the absence of the pneumococcus or other causative bacterium in the sputum there has been a tendency to assume a virus etiology although usually not demonstrated in the clinical laboratory. Cellular inclusion bodies were noted by Drs. R. G. Green and N. Beach in a recent case of atypical pneumonia on the medical service.[9] Weir and Horsfall[10] recovered a virus from patients with acute pneumonitis. Adams[11] has reported an epidemic of primary virus pneumonitis in infants in which cytoplasmic inclusion bodies were commonly found in the bronchial epithelial cells of infants dying from the disease. It would be fallacious to assume that a common etiological agent exists in all atypical cases. Until the etiological agent or agents are demonstrated, delineation of cases with similar clinical features into entities will aid in the study of the etiology as well as evaluation of the course of disease.

REPORT OF CASES

CASE 1

P. M. S., a twenty year old female, was admitted to the Students' Health Service on November 19, 1941. She complained of general malaise associated with generalized aching in the back and lower extremities for twenty-four hours previous to admission.

Previous History: Patient had been treated in the dispensary for chronic otitis media which had existed since the age of ten. On a previous admission in January, 1941, for an acute upper respiratory infection, a pure culture of hemolytic streptococcus was isolated from a pharyngeal smear. Recovery on this date was uneventful and patient was discharged after four days' hospitalization.

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*From Students' Health Service, University of Minnesota.

Examination: Patient appeared to be a well-nourished, lethargic female acutely ill. Temperature was 102, pulse was 90, and respiration 20. Otoscopic examination revealed a perforated membrane on the right, with a moderate amount of exudate in the external auditory canal. Except for a systolic murmur heard over the apex and along the left border of the sternum, chest examination was entirely negative. Chest X-ray on this date was read as negative. There was noted a mild but diffuse abdominal tenderness.

Laboratory: Blood examination revealed a leucocyte count of 8,700. Differential: 79 per cent polymorphonuclear leucocytes, 20 per cent lymphocytes, 1 basophil. Pneumococci were not found in the sputum by direct Neufelt, and no pneumococci or other organisms were found on mouse inoculation. Blood culture was read as sterile one day and two days.

Clinical Course: Patient's condition was essentially the same until November 21, 1941 (two days after admission), when on examination a few fine crepitant rales were noted at the left base. These tended to disappear on deep respiration, and it was felt that this represented a minimal area of localization. Chemotherapy was instituted with an initial dose of 2 grams (sulfadiazine) and 1 gram every 4 hours thereafter. On November 22 the X-ray revealed a pneumonic process in the left lower lobe with some pleural effusion. On November 24 general condition was satisfactory, there was no appreciable cyanosis, and chemotherapy was continued. Blood sulfadiazine level on this date was 13/6 mgms. per cent. On November 26 it was felt that no appreciable benefit had occurred from chemotherapy, so it was discontinued. At that time there was blowing breathing in the left base and intense whispered voice. Some cyanosis was observed both of the lips and nail beds. Repeated sputum examinations on this date were negative as were also blood cultures. Other blood cultures were taken on November 28 and December 4. The culture taken on day of admission revealed staphylococci, coagulase negative, on the seventh day of incubation. The cultures of November 28th and December 4th remained negative.

The temperature continued with diurnal variations between 101 and 104. X-ray examination on November 26 showed a marked extensive consolidation on the left with effusion in the left pleural cavity. On the right there was extensive consolidation in the middle lobe with minimal effusion. On November 28 condition in general seemed satisfactory. However, there was evidence of spread of the pneumonic process with tubular breathing over the entire left and right middle lobe. Patient was less apprehensive and quite comfortable. Pharyngeal smears on this date were examined for inclusion bodies, but none were found. The following day cyanosis increased with rather marked dyspnea. On December 2, or the fourteenth day of hospitalization, patient developed a definitely rusty sputum in which no pneumococci could be demonstrated by direct Neufelt or mouse inoculation. In spite of supportive treatment, such as oxygen therapy, repeated small blood transfusions, and sedation for cough, condition became progressively worse with marked prostration and dyspnea. *Temperature* ran a septic course from 103 down to 99 on the second hospital day. Then reached its peak of 104.8 on November 27. Then it dropped to 97 and again on the tenth day it reached 104. The pulse rate had ranged between 100 and 120 throughout the hospital stay until December 2 (fourteenth day) it reached 140 while the temperature fell to 100. The following day the pulse continued to rise until it could not be counted with accuracy (above 160). Temperature was 102. Patient was comatose, had severe respiratory difficulty, and expired on December 4, 1941 (sixteenth hospital day).—E. H. L.

Autopsy by Dr. T. E. Bratrud. Positive findings reported.

Pathology report: Inspection of myocardium showed no evidence of disease. Mitral valve at the free margin of its cusps and on their superior surfaces showed numerous tiny pin-point to pin-head sized fresh, translucent, pearly-like vegetations. A few tiny vegetations were seen on the free margins of the tricuspid and pulmonary valves. All those on the valves other than the mitral area were seen with great difficulty and they were wiped away from the valve cusps with ease. The coronary arteries were soft, silvery and patulous throughout. *On microscopic examination* these sections of the mitral valve revealed a rheumatic type of vegetation; no change in the heart muscle itself.

Lungs: Pleural surfaces showed a reddish mottling throughout. On section of the bronchi a considerable amount of bloody mucus was found. On section of the lung parenchyma numerous areas of consolidation were seen to be scattered throughout the lung parenchyma of each lung. Some of these areas of consolidation were greyish and resembled grey hepatization. Others were distinctly reddish and resembled red hepatization. From some of these areas of consolidation small plugs of mucus and pus could be expressed from the tiny bronchi. Intervening areas of lung parenchyma showed distinct hemorrhages varying in size from 1 to 10 mm. These hemorrhages were irregular in shape and some appeared to be confluent.

Microscopic examination of the lungs showed small bronchi filled with purulent material consisting chiefly of mononuclears. Many had a diffuse cellular infiltrate of their walls with desquamation of their epithelium and mononuclear infiltrate extending outwards into the parenchyma. The surrounding alveoli were mainly filled with mononuclears for a variable distance from these bronchi. Outwards in the parenchyma away from these areas of miliary bronchopneumonia the alveoli were filled to varied degrees with mononuclears, serum and fibrin. Many alveoli contained a number of red cells as well, some of these areas being actual hemorrhages. Many alveoli also contained fibrin placques along the inside of the alveolar epithelium. No distinct inclusion bodies were found in the bronchial epithelium.

Liver: Sections of the liver showed acute hepatitis with necrosis of the central portions of the lobules immediately about the central vein and extending outward for a variable distance.

Kidneys: Sections showed changes in tubules consistent with cloudy swelling.

Diagnosis: (1) Influenzal type pneumonia, (2) Acute endocarditis, (3) Acute hepatitis, (4) Cloudy swelling, liver, kidneys, and heart.

CASE 2

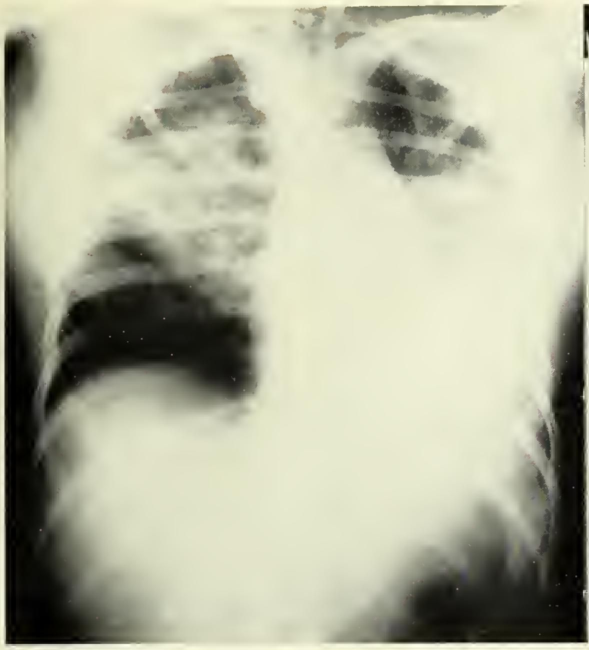
R. E., a male engineering student, aged 20, came to the Students' Health Service dispensary April 1, 1941, complaining of a rash on both legs of one day's duration. With the exception of rubeola at the age of eight, and occasional mild upper respiratory infections, his health had always been excellent.

He was seen by the consulting dermatologist, who noted the presence of urticarial papules on both lower legs, with out subjective symptoms. Zinc lotion was prescribed. The following day the eruption was found to have extended slightly, but there were no local or systemic symptoms. On April 3 the eruption was much more severe. The lesions were now exudative, purpuric, and they had extended to the thighs. He complained of pains in the legs and weakness. The temperature was 99.2. In the opinion of the dermatologist the most likely diagnosis was erythema multiforme of purpuric type. Hospitalization and treatment with sulfanilamide was advised.

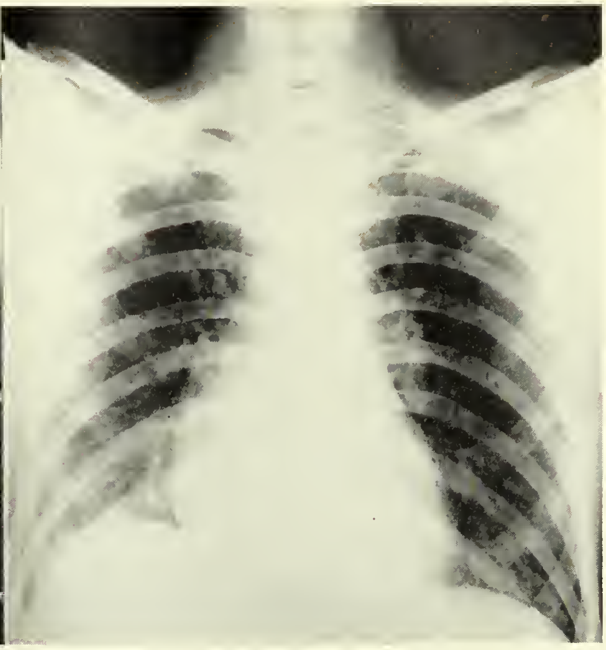
Physical examination upon entry to the hospital revealed a well-developed, well-nourished boy who was acutely ill. The temperature was 102.6, pulse 86, respiration 20, blood pressure 118/70. The face was flushed, and there were numerous large, purplish-red, confluent ecchymotic areas over both legs, thighs, buttocks, and elbows. There was moderate swelling in the regions of the eruption. There was a moderate, diffuse pharyngitis. Examination of the heart revealed no alterations in tones, and no murmurs were heard.

Examination of the urine was negative. The white blood cell count was 16,600, with 78 per cent neutrophils, 16 per cent lymphocytes, 5 per cent monocytes, and 1 per cent basophils. The hemoglobin was 12.8 grams. The platelets were 210,000; the bleeding time 75 seconds; and the clotting time 60 seconds. The blood Kline exclusion test was negative.

The admission diagnosis was erythema multiforme with marked systemic reaction. Therapy was begun with 2 grams of sulfanilamide, followed by 1 gram of sulfanilamide every four hours.



(Fig. 1). Case 1. P.M.S. 13th day of illness shows a shift of the mediastinum to the left with some atelectasis and pleural effusion. Extension of the process on the right with involvement of both upper and lower lobes with mottling.



(Fig. 2). Case 2. R.E. 9th day of illness. Diffuse mottling throughout both lung fields, especially at the right base.

On April 4, the temperature rose to 103.8; some mental confusion was evident; and he complained of pain in the left anterior chest which did not seem to be related to respiration. Physical examination of the heart and lungs was negative. The pulse ranged between 92 and 108. X-ray examination of the chest was negative. Blood cultures done on this date and on April 5 remained sterile.

On the morning of April 6 his general condition appeared much improved; the rash was fading; and the temperature had fallen to 100.4. By afternoon, however, the temperature rose again to 103; mental confusion was marked; and physical examination revealed a high-pitched, musical systolic murmur of Grade II intensity, well-localized to the mitral area. The pulse was 94, blood pressure 108/68. Physical examination of the lungs was negative. No petechiae were seen, and a third blood culture done at this time remained sterile. Urinalysis was again negative. The plasma ascorbic acid level was 0.18 mgm./per cent, and the cuff test was slightly positive (10-15 petechiae). The white blood cell count was 19,800, the hemoglobin 14 grams. The carbon dioxide combining power of the blood plasma was 43 volumes/per cent; the blood chlorides 656 mgm./per cent; and the blood urea nitrogen 11.7 mgm./per cent. The blood sulfanilamide level was 7.8 mgm./per cent. X-ray examination of the lungs revealed a diffuse mottling over both lung fields, suggesting a marked capillary pneumonia or purulent bronchitis. The Mantoux reaction with 0.1 mgm. of old tuberculin was negative. A later test with 0.1 mgm. was also negative.

Because of the lack of response to sulfanilamide, this drug was now discontinued, and replaced by sulfathiazole, in doses of 1 gram every four hours; 1,000 mgm. of ascorbic acid was given intravenously. The clinical diagnosis at this time was probable endocarditis, etiology unknown, with a diffuse pneumonic process in both lungs, etiology undetermined. (Cough was never prominent, and no sputum could be obtained at any time.)

His general course continued critical with fever ranging between 100 and 102. Mental confusion was marked, and he complained bitterly of muscular aching. No arthritic manifestations were noted at any time. The pulse ranged between 90 and 100. The character of the heart murmur changed rapidly, varying in a few hours from a high-pitched musical murmur, well transmitted to the left apex, to a soft, low-pitched bruit, well-localized to the mitral area. These variations, and gradations between them, were repeatedly observed.

On April 7 agglutinins against E. Typhosis and Paratyphosus A and B, B. Tularense, and Br. Melitensis were absent in the blood serum. The blood sulfathiazole level was 7.3 mgm./per cent. Urinalysis was negative except for an occasional red blood cell, and many sulfathiazole crystals. The white blood cell count was 25,200. An electrocardiogram revealed no abnormalities.

On April 9 physical examination of the lungs revealed moderate dullness and numerous fine rales over the right lower lobe posteriorly. X-ray examination of the chest on this date revealed a progression of the diffuse mottling, particularly at the right base. On April 11 it was noted that the right side of the heart appeared to be enlarged to percussion, and the spleen was just palpable. Therapy at this time consisted of sulfathiazole 6 grams each day, plus 2,250 cc. blood transfusions a day, and intravenous glucose. He also received ascorbic acid 100 mgm. a day intravenously and later orally.

On April 12 agglutinins against Brucella Melitensis were present in the blood serum in a dilution of 1:80. A special blood culture for Brucella was done on this date and was later reported as negative by the laboratories of the Minnesota State Department of Health. On April 13 a skin test with 0.1 cc. of a 1:100 dilution of Brucella vaccine (Lederle) was negative. On April 18 the titer of Brucella agglutinins was again 1:80.

On April 14 a diastolic murmur, presystolic in time, was heard, and it was noted that there was accentuation of the first sound at the apex, and that the second pulmonic sound was also increased.

Improvement was noted at about this time in his general condition. The temperature and pulse began to fall slowly, and the mental status was much improved. The blood transfusions were discontinued after ten had been given. Sulfathiazole was continued, the blood levels ranging between 5.0 and 7.0 mgm./per cent. No nodules were noted along the paths of the arteries, and eosinophilia did not appear. The diastolic murmur varied in intensity from day to day, but was repeatedly noted. On April 23 a six foot heart film revealed some prominence in the region of the pulmonary conus. At this time the clinical diagnosis was rheumatic endocarditis with pulmonary involvement of undetermined type.

He became afebrile on April 21. An electrocardiogram on April 29 showed a shifting sinus pacemaker in Lead III, and a lowered potential of T_1 as compared with the previous tracing. The P-R intervals were within normal limits. Sulfathiazole was discontinued on April 29, the total amount of chemotherapy having been 153 grams. The white blood cell count on May 1 was 7,150 and the sedimentation velocity was 17 mm. in 1 hour and 54 mm. in 2 hours. X-ray examination of the chest on May 7 showed marked clearing of the pulmonary process, but there was still a residual increase in the bronchovascular markings bilaterally. The prominence in the conus region was again noted.

He was discharged from the hospital on May 17. On July 15 he returned to the dispensary, stating that he felt well except for rather marked fatigue after mild exertion. The pulse was 90, the blood pressure 124/64. No accentuation of the heart tones was now noted, and the diastolic murmur had disappeared. There was a high-pitched systolic murmur of Grade II intensity at the apex transmitted throughout the left chest. Fluoroscopic examination of the heart was negative, and a six foot heart film showed the heart to be within normal limits; the residual increased markings in the lung fields was again shown. The white blood cell count was 7,900, hemoglobin 17 grams, and the sedimentation velocity 1 mm. in 1 hour and 2 mm. in 2 hours. An electrocardiogram on July 15 was within normal limits.

The final diagnosis was rheumatic endocarditis; mitral insufficiency; probable mitral stenosis, early; probable rheumatic pneumonitis.—J. J. B.

DISCUSSION OF CASES

In case 1 with fatal termination, the pneumonic process while slow in developing, involved greater areas than observed in the recovered cases with coalesence in both lung fields and with physical signs of consolidation. Radiologically mottled infiltration was also seen. Greater prostration developed in this case; the cardiac signs were not emphasized clinically although a systolic murmur over the precordium was present throughout the course of disease. The termination was characterized by increasing pulse and respiratory rate with falling temperature. While death might be classified as due to circulatory failure it was considered to be secondary to the extensive pneumonic process rather than to myocardial failure; there was no evidence of congestive heart failure.

In case 2 the early and marked cardiac signs including extensive systolic murmur and variation in cardiac contour and the demonstration of splenic enlargement focused attention upon the endocarditis; the bacterial type was first considered. However, as the picture developed and as any evidence of embolic phenomena or of bacterial blood stream invasion did not appear the clinical diagnosis was acute rheumatic endocarditis and pneumonitis. Coincidently with cardiac findings the signs of pneumonitis also developed with diffuse rales throughout the lung fields, with smaller areas suggesting coalesence; radiologically mottled areas were noted throughout. These were miliary in character and suggested bronchiolitis. Complete recovery from the acute stage of the process occurred and when this individual was rechecked nearly two months later the temperature, leucocyte count and sedimentation rates were normal, the roentgen film showed only residual of increased markings in the lung fields. The heart area, 6 foot anterior-posterior film, was within normal limits. The electrocardiogram was within normal limits. An apical systolic murmur, moderately loud, intense, with transmission into the axilla was now present. Definite fatigue tendency since illness had been noted by the patient. The diagnosis was mitral valvular deformity with mitral insufficiency and probably minimal stenosis.

GENERAL DISCUSSION

Pulmonary complications of acute rheumatic fever are not rare. Thayer[12] noted in 25 cases of acute rheumatic fever coming to autopsy that 11, or 44 per cent, had bronchopneumonia; in 10 of the 11 it was terminal. Other observers speak of rheumatic pneumonia. Rabinowitz[13] discusses it as occurring early in certain cases of acute rheumatic fever. He states that arthritis frequently preceded and usually disappeared during the course of the lung manifestations, occasionally to reappear and interprets the pneumonopathy as due to the virus of rheumatic fever. Gouley[14] likewise emphasizes the pulmonary complications of acute rheumatic fever, that occur during the acute stage of severe illness with marked articular symptoms and believes that the residual contracture from interstitial pneumonitis may account for the cardiac overload in some cases of mitral deformity with inadequate cardiac pathology to account for the circulatory embarrassment. Epstein and Greespan[15] in a recent review of the literature of rheumatic pneumonopathy and report of their study of autopsy material, state that while many writers of the past century attribtued the various pulmonary symptoms to a specific rheumatic infection, that in the present century only the specificity of rheumatic pleurisy is answered in the affirmative. These observers studied 45 autopsy cases in 14 of which the patient died during the first attack of acute rheumatic fever and concluded that a specific rheumatic pneumonia cannot be considered to exist. Aschoff bodies were not found and they describe a characteristic but non-specific pulmonary picture with lesions of alveolitis, edema, and engorgement, considered to be the result of damage to the capillaries with resultant alteration in vascular permeability. The vascular change corresponded to the arterial tree involvement noted in various organs of the body in rheumatic fever.

The initiation of rheumatic disease with pneumonitis in two cases herein reported is impressive. The pneumonopathy appeared as an integral part of the process rather than a complication and in this way differs from the secondary pulmonary lesion often described as occurring in the course of rheumatic fever. It is well known that the articular component of the rheumatic syndrome may be entirely lacking particularly in southern climates where however the rheumatic valvular deformities are not uncommonly found clinically and pathologically. It may be asked how often in the rheumatic process that pneumonia occurs as an integral part comparable to the articular component of so-called typical rheumatic fever. If it may be assumed that the pulmonary lesion is a part of the rheumatic process and not a fortuitous occurrence the search for the etiological agent would appear to have a broader base in similar cases encountered and include all methods for examination of the sputum and blood stream. It would appear that among cases of so-called virus type of pneumonia various etiological entities may exist and the question may be asked whether one of these may be due to the virus or causative agent of rheumatic fever.

SUMMARY

1. Two cases of atypical, presumably virus pneumonia are presented in both of which coincident rheumatic endocarditis appeared. In one fatal case the pneumonopathy as well as endocarditis was considered by pathologists to be consistent with the rheumatic process.

2. The clinical phenomena in the cases reported direct attention to the similarity of the pneumonopathy to atypical pneumonia and suggest consideration of a common etiology of the pulmonary and endocardial lesions.

BIBLIOGRAPHY

1. Bell, E. T., and Clawson, B. J.: Personal communication.
2. Allen, W. H.: Acute Pneumonitis, Ann. Int. Med. 10:441, (Oct.) 1936.
3. Bowen, A.: Acute Influenza Pneumonitis, Am. J. Roentgenol. 34:168, (Aug.) 1935.
4. Reimann, H. A.: An Acute Infection of the Respiratory Tract with Atypical Pneumonia: A Disease Entity Probably Caused by a Filtrable Virus, J.A.M.A. 111:2377, (Dec. 24) 1938.
5. Reimann, H. A., and Stokes, J., Jr.: Epidemic Infection of Respiratory Tract in 1938-1939: Newly Recognized Entity, Tr. A. Am. Physicians 54:123, 1939.
6. Smiley, D. F., Showacre, E. C., Lee, W. F., and Ferris, H. E.: Acute Interstitial Pneumonitis: A New Disease Entity, J.A.M.A. 112:1901, (May 13) 1939.
7. Longcope, W. T.: Bronchopneumonia of Unknown Etiology (Variety X), Bull. Johns Hopkins Hosp. 67:268, (Oct.) 1940.
8. McKinlay, C. A., and Cowan, D. W.: Acute Respiratory Infections Including Lobar Pneumonia and Atypical Pneumonia in a Young Adult Group: Journal-Lancet LXI:4:125, (April) 1941.
9. Green, R. G., and Beach, N.: Personal communication.
10. Weir, J. M., and Horsfall, F. L., Jr.: The Recovery from Patients with Acute Pneumonitis of a Virus Causing Pneumonia in the Mongoose, J. Exper. Med. 72:595, (Nov.) 1940.
11. Adams, John M.: Primary Virus Pneumonitis with Cytoplasmic Inclusion Bodies, J. A. M. A. 116:925, (March 8), 1941.
12. Thayer, W. S.: Notes on Acute Rheumatic Disease of the Heart, Bull. Johns Hopkins Hosp. 36:99, (Feb.) 1925.
13. Rabinowitz, M. A.: Rheumatic Pneumonia, J.A.M.A. 87:142, (July-Dec.) 1926.
14. Gouley, B. A.: The Acute and Subacute Pulmonary Involvement in Rheumatic Fever with Notes on the Complication of Basal Pulmonary Collapse, Ann. Int. Med. 11:626:1937.
15. Epstein, E. J., and Greespan, E. B.: Rheumatic Pneumonia, Arch. Int. Med. 68:1074-1094, (Dec.) 1941.

Advances in the Medical Treatment of Glaucoma* **

Kenneth C. Swan, M.D.

Iowa City, Iowa

THE treatment of glaucoma presents one of the most important problems in ophthalmology, but several advances in medical treatment have been made in recent years. New agents are now available and in addition, ophthalmologists make better use of previously known drugs such as epinephrine.

The synthetic choline derivatives are the most important of the new agents. Many of these compounds are powerful miotics and several have been introduced as substitutes for pilocarpine and eserine. However, the choline derivatives have not had a proper evaluation in the treatment of glaucoma as it has not been recognized that they are poorly absorbed through the normal cornea. The effectiveness of instillations of these drugs can be increased 50 to 100 times by disturbing the corneal epithelium by direct massage or by topical anesthesia (pontocaine, holocaine, etc.)[1]. Massage of the cornea through the lids is alone sufficient to produce a considerable increase in absorption.

Acetylcholine is the best known of the choline derivatives but its action is so short-lived that it has little practical value in the treatment of glaucoma. Of the other derivatives studied in the past three years, doryl has proven to have the greatest value. This drug has received little attention from ophthalmologists and in the few reports concerning the intensity of its ocular effects, there has been no unanimity of opinion. The lack of agreement is understandable as it has not been recognized that doryl in aqueous solution is poorly absorbed. In studies conducted in the Eye Clinic of the State University of Iowa, it has been observed that doryl is consistently absorbed when a surface tension reducing agent, e. g., 0.03 per cent zephiran, is added to the aqueous solution. Absorption is enhanced further by massage of the cornea through the lids. When administered in this manner, doryl reduces intra-ocular tension, is a powerful miotic, and produces spasm of accommodation. In equal concentrations, its action is not only more pronounced than that of pilocarpine, but also more prolonged.

Doryl in zephiran solution has been used in the treatment of glaucoma simplex for over two years. In many advanced cases, 1.5 per cent doryl in 0.03 per cent zephiran solution administered two to three times daily has controlled tension and prevented further loss of visual field after 2 to 4 per cent pilocarpine has failed. One-third of these patients have had unsuccessful operations, and pilocarpine has been ineffective postoperatively. The comparative effects of doryl and pilocarpine in a group of thirty-four eyes with advanced glaucoma simplex is

*From the department of ophthalmology, College of Medicine, State University of Iowa, Iowa City, Iowa.

**Read before the annual meeting of the South Dakota State Medical Association, Mitchell, May 18-20, 1941.

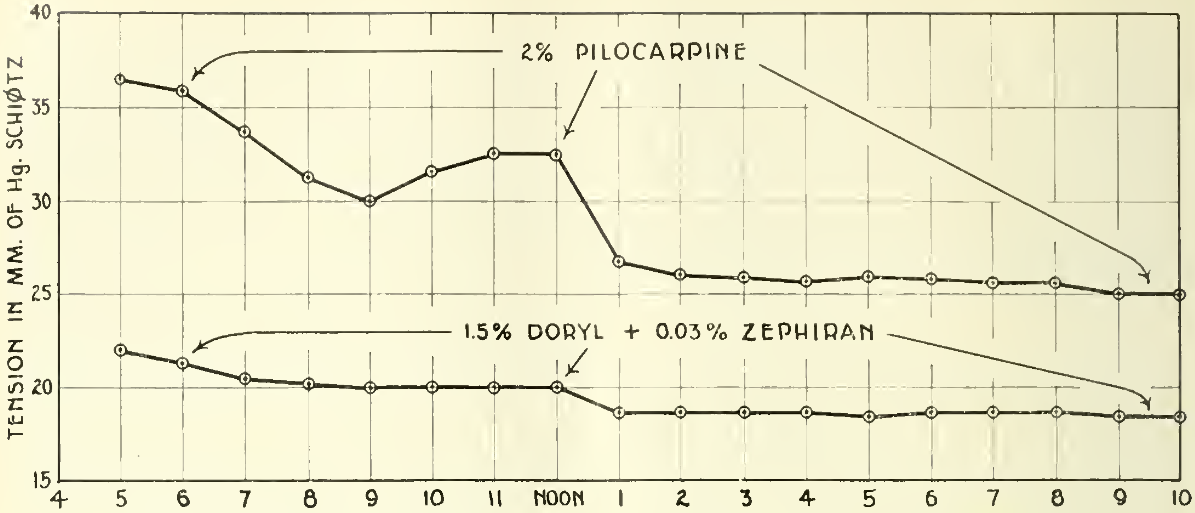


Fig. 1. Average intradiem tension curves of 34 eyes under doryl-zephiran solution, and under pilocarpine. Average of 1,482 tonometric determinations.

shown in Figure 1. With doryl the tension has been maintained at a lower level and intradiem variations have been less marked.

No ill effects have been noted from prolonged administration of doryl and systemic reactions and local sensitivity have been rare. However, headache and varying degrees of conjunctival hyperemia frequently follow the initial instillations of the drug, but are uncommon after the first week of treatment. A change in the refractive error toward myopia results from the intense stimulation of accommodation.

Surface tension reducing agents other than zephiran are effective in increasing the absorption of doryl. Zephiran is used at present because it has had trial as an ocular antiseptic, and its ocular effects are known.[2,3] In concentrations of 0.02 to 0.03 per cent, zephiran ordinarily does not produce biomicroscopic evidence of damage to the corneal epithelium. Superficial punctate disturbances rarely occur, but recovery is prompt when the drug is discontinued. Doryl in zephiran solution is stable and produces little conjunctival irritation.

Mecholyl, another choline derivative, has more prolonged action than acetylcholine but much less than doryl or eserine. Because of the limited duration of its effects, mecholyl is used only in acute congestive glaucoma. It is usually well absorbed in this type of glaucoma as the corneal epithelium is seldom normal and is further disturbed by the topical anesthesia and trauma associated with instrumental tonometry. In our experience, 10 per cent mecholyl has not been more effective than 2 per cent eserine in controlling tension. However, most patients have much less systemic reaction from mecholyl than from eserine when the instillations are repeated at frequent intervals. Eserine acts over a period of hours; consequently, its systemic effects become accumulative with successive doses repeated at short intervals. Nausea, diarrhea, pallor, weakness, sweating, salivation, and a drop in blood pressure are the common signs and symptoms. In contrast, the action of mecholyl is so short-lived that systemic effects of repeated instillations seldom become summated. However, when mecholyl is administered by retrobulbar injection, as advocated by Clarke,[4] the systemic vascular reaction may be alarming. Although this type of reaction is short-lived and can be overcome by an intravenous injection of atropine, it is dangerous in older patients with hypertension or advanced arteriosclerosis. The combination of eserine and mecholyl is more potent theoretically than either used alone as eserine prevents the destruction of mecholyl by the tissue esterases, and thereby enhances and prolongs its action. However, clinical experience indicates that the increased effectiveness is significant only in an occasional case. Clarke[4] advocates the use of prostigmine in place of eserine as an adjunct to mecholyl. He has found that this drug is more stable, less irritating and more effective than eserine.

The hypotensive effect of epinephrine was recognized many years ago but it was commonly used in 1:1000 or weaker dilutions. Instillations into the conjunctival sac had little effect on the intra-ocular pressure; consequently, the drug had to be administered by subconjunctival injection or by a saturate pledget of cotton placed in the upper fornix. The extensive use of 1 or 2 per cent concentrations which are effective by instillation has evolved only in the past decade. Ointments containing the hydrochloride or bitartrate salts are stable and only slightly irritating. In contrast, aqueous solutions are unstable and irritating even when buffered; consequently, they are suitable only for office or hospital use.

Epinephrine salts in 1 or 2 per cent concentrations are potentially dangerous in that systemic reactions occur in susceptible patients and acute elevations in intraocular tension may result in certain types of glaucoma. The use of miotics in conjunction with epinephrine lessens the incidence but does not always prevent the occurrence of the undesirable rise in tension. Therefore, it is a safe rule to observe the glaucoma patient at least

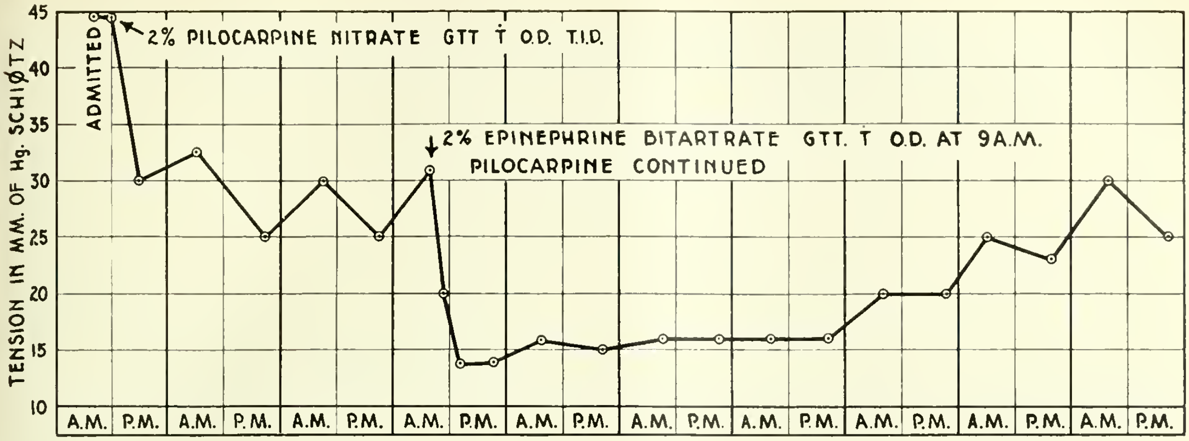


Fig. 2. Changes in the intra-ocular pressure produced by epinephrine used as an adjunct to pilocarpine.

several hours after epinephrine is administered for the first time.

Epinephrine has had greatest value as an adjunct to pilocarpine therapy of chronic noncongestive glaucoma. With patients for whom surgery is inadvisable and miotics are only partially effective, the administration of epinephrine once or twice weekly may control the tension and prevent loss of visual field. A typical tension curve is shown in Figure 2. In chronic noncongestive glaucoma, a significant rise in intra-ocular tension rarely follows the administration of epinephrine and then only in those cases in which there are advanced changes in the anterior segment of the eye. These changes include multiple anterior synechiae, extremely shallow anterior chambers, and degenerative processes in the iris.

In acute or chronic congestive glaucoma of the primary type, the risk of a disastrous rise in tension outweighs the chance for success even when a miotic is used in conjunction with epinephrine. Consequently, the drug is contraindicated in these forms of glaucoma.

The value of epinephrine in glaucoma secondary to acute iridocyclitis is disputed. Barkan and Maisler[5] believe that the drug is indicated in these cases but Gifford[6] and Post[7] do not share this opinion. The effects on the intra-ocular tension are unpredictable, and the physician must be prepared to perform a paracentesis if tension rises. In some patients, the inflammatory process seems to be accentuated by the vasodilatation and congestion which may follow the primary phase of intense vasoconstriction. However, epinephrine in combination with cocaine may be of value in rupturing newly formed posterior synechia as these drugs accentuate the mydriasis produced by scopolamine or atropine.

In glaucoma secondary to uveal inflammation, treatment of the uveitis is the primary consideration. The uveitis should be treated by the belladonna group of drugs and some form of fever therapy. The drug of choice for adults is scopolamine hydrobromide in 0.2 per cent solution. Instilled two or three times daily, its cycloplegic and mydriatic effects are equal to those of 1 or 2 per cent atropine. Scopolamine is more toxic than equal doses of atropine but in the dilute concentrations used, systemic reactions are considerably more rare than local sensitivity reactions to atropine. These reactions to atropine vary in intensity from a mild chronic follicular conjunctivitis to an acute inflammatory process involving the lids, conjunctiva, and cornea. Homatropine produces a greater degree of undesirable vascular congestion than either atropine or scopolamine and its action is so short that it must be administered frequently to maintain its full effects. The tension in patients with glaucoma secondary to uveitis can usually be controlled by restriction of fluids, the administration of intravenous sorbitol, or by paracentesis. If necessary in chronic cases, the paracentesis may be repeated utilizing the initial puncture wound. Miotics, particularly, eserine, have an adverse effect on the inflammatory process.

Sorbitol, an alcohol with about the same molecular weight as glucose, was introduced in ophthalmology by Bellows, Puntenney, and Cowen[8] in 1938. It is injected intravenously in a 50 per cent solution and the usual dose is 50 to 100 cc. Sorbitol acts by making the blood plasma hypertonic to the intra-ocular fluids so that water is withdrawn from the eye by osmosis. In addition, it is a powerful diuretic and if fluids are limited, a systemic dehydration occurs in which the eye participates. The action on the intra-ocular pressure is fairly constant, but occurs only after a latent period, and the drop in pressure is seldom great. The maximum change in tension does not occur until approximately 10 to 12 hours after administration, and lasts only 12 to 36 hours. However, the full effect can be maintained for several days by repeating the dose every twenty-four hours.

Sorbitol has been of most value in glaucoma of mild or moderate degree secondary to acute inflammation in the anterior segment, e. g., trauma, keratitis, iridocyclitis. In these cases, the glaucoma usually does not persist after the acute process subsides; consequently, the control of tension may be necessary for a few days only. By the use of sorbitol, paracentesis may be avoided in an occasional patient. A particularly favorable result is shown in Figure 3. In glaucoma due to swelling or subluxation of the lens, sorbitol may be of value to reduce tension pre-operatively, but it often has no effect. In

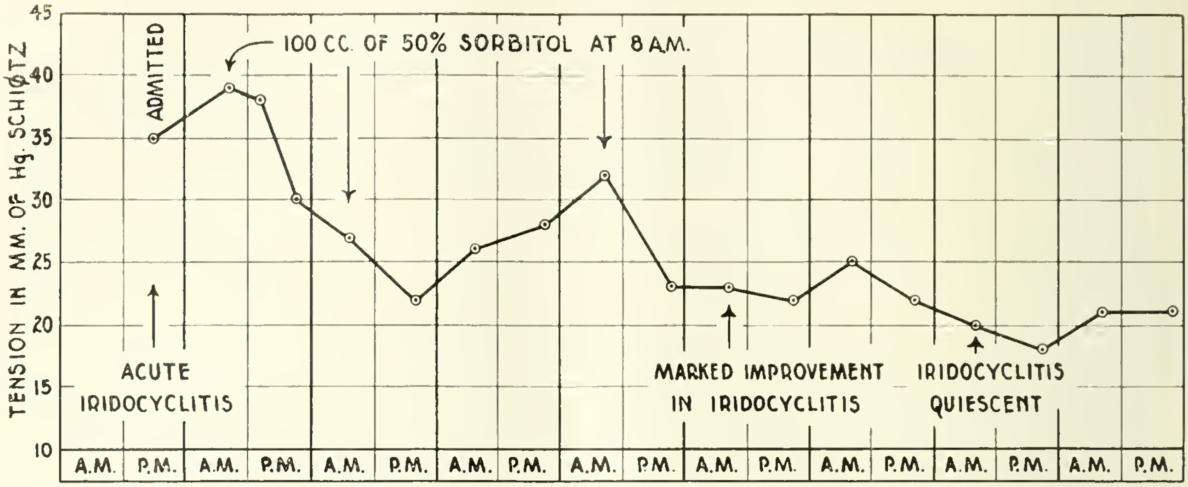


Fig. 3. Effect of sorbitol on the intra-ocular tension in secondary glaucoma. (Fluid intake limited to 1200 cc. daily. Iridocyclitis treated with scopolamine and intravenous typhoid "H" antigen.)

acute congestive glaucoma of the primary type, sorbitol may serve as an adjunct to miotics pre-operatively but because of its delayed action and limited effects, it cannot be used alone.

Hypertonic solutions of glucose, saline, or sucrose have been advocated but these agents are not suitable substitutes for sorbitol. Glucose and sodium chloride pass readily into the eye from the plasma so that the osmotic effects are usually slight and may be followed by a secondary rise in tension. Moreover, hypertonic glucose is a sclerosing solution and must be injected with great care if solutions more concentrated than 25 per cent are used. Sucrose does not enter the ocular fluids readily; consequently, its osmotic pressure effects are more pronounced than are those of glucose or sodium chloride. However, there is experimental evidence that intravenous sucrose produces renal damage.[9]

SUMMARY AND CONCLUSIONS

New agents, new combinations of new and old drugs, and improved methods of administration have widened the scope of medical treatment in glaucoma. In advanced glaucoma simplex, doryl in zephiran solution and concentrated epinephrine have increased considerably the effectiveness of medical treatment either as an alternative or as an adjunct to surgery. The use of doryl has been particularly encouraging.

In pre-operative treatment of acute congestive glaucoma, mecholyl has not proved more effective than eserine, but systemic reactions are less apt to occur following repeated instillations. In an occasional case, combinations of mecholyl and eserine, or mecholyl and prostigmine may be more effective than use of these drugs alone.

Intravenous injections of various hypertonic solutions have been advocated to reduce tension. Glucose and saline are ineffective and sucrose produces renal damage. Sorbitol has been the only suitable agent but its value has been limited.

BIBLIOGRAPHY

1. O'Brien, C. S., and Swan, K. C.: Doryl in the Treatment of Glaucoma Simplex. To be published.

2. Thompson, R., Isaacs, M. L., and Khorazo, D.: A Laboratory Study of Some Antiseptics, Am. J. Ophth. 20:1087, (Nov.) 1937.

3. Smith, C. S.: Some Recent Advances in Ophthalmology. J. Missouri M. A. 36:72-76, (Feb.) 1939.

4. Clarke, S. T.: Mecholyl and Prostigmine in Treatment of Glaucoma, Am. J. Ophth. 22:249-257, (March) 1939.

5. Barkan, Otto, and Maisler, S.: Adrenalin Chloride 1:100 in Ophthalmology, Am. J. Ophth. 20:504-507, (May) 1937.

6. Gifford, S. R.: Treatment of Secondary Glaucoma, Arch. Ophth. 23:301-315, (Feb.) 1940.

7. Post, L. T.: Laevo-glaucosan and Epinephrine Bitartrate in the Treatment of Glaucoma, Arch. Ophth. 11:187-193, (Jan.) 1934.

8. Bellows, R. T., Puntenney, I., and Cowen, J.: Use of Sorbitol in Glaucoma, Arch. Ophth. 20:1036-1043, (Dec.) 1938.

9. Lindberg, H. A., Wald, M. H., and Barker, M. H.: Renal Changes following Administration of Hypertonic Solutions, Arch. Int. Med. 63:907-918, (May) 1939.

Choline derivatives for this study were kindly supplied by Merck & Co., Inc. Zephiran was supplied by the Alba Pharmaceutical Co., Inc.

Congenital Atresia of the Duodenum

With Coexisting Congenital Band Obstruction of the Lower Bowel and Other Anomalies

Geoffrey I. W. Cottam, M.D., F.A.C.S.

Gilbert Cottam, M.D., F.A.C.S.

Sioux Falls, South Dakota

THE simultaneous occurrence of two separate and distinct congenital lesions of the intestinal tract, both uncommon, life-threatening and surgically emergent, together with three other congenital anomalies in the same individual, in spite of all of which the patient has survived and reached the normal childhood of his age, seems interesting enough to warrant a report of the case, which occurred in the practice of one of us (G.I.W.C.) nearly five years ago.

The patient, the second child of American white parents, was born somewhat prematurely, the mother's last menstruation having begun on August 28, 1936, and the birth of the baby having occurred on May 21, 1937, five hours after the beginning of labor. During the last month of the mother's first pregnancy she had developed albuminuria with hypertension but this had subsided without recurrence and during the present pregnancy the only abnormality noted in her condition was a mild secondary anemia. The father was healthy.

At birth the baby weighed five pounds and fourteen ounces and appeared normal. He was given glucose water by mouth during the first twenty-four hours and breast milk during the second day, but it was noted from the first that none of the feedings were retained but were vomited with unfailing regularity three hours after ingestion. Normal saline solution was given subcutaneously and the vomitus examined for the presence of bile, without any being found. An obstruction of the duodenum, above the ampulla of Vater, was suspected. On the fourth postnatal day, there having been no abatement of the

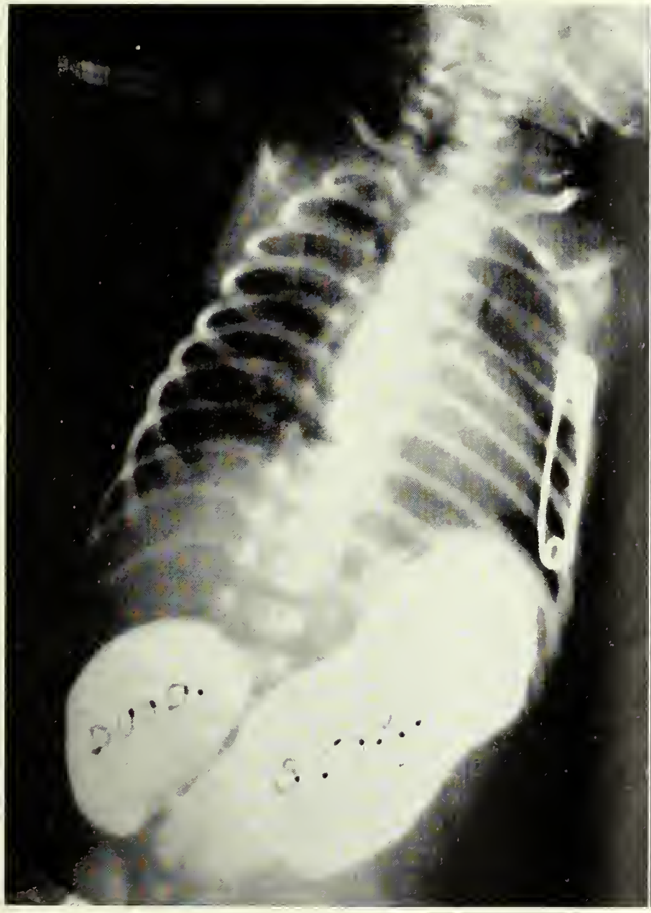


Fig. 1. Baby Douglas P——, four days old, showing appearance of stomach and completely blocked first portion of duodenum, immediately after ingestion of barium meal, taken eight hours before operation.

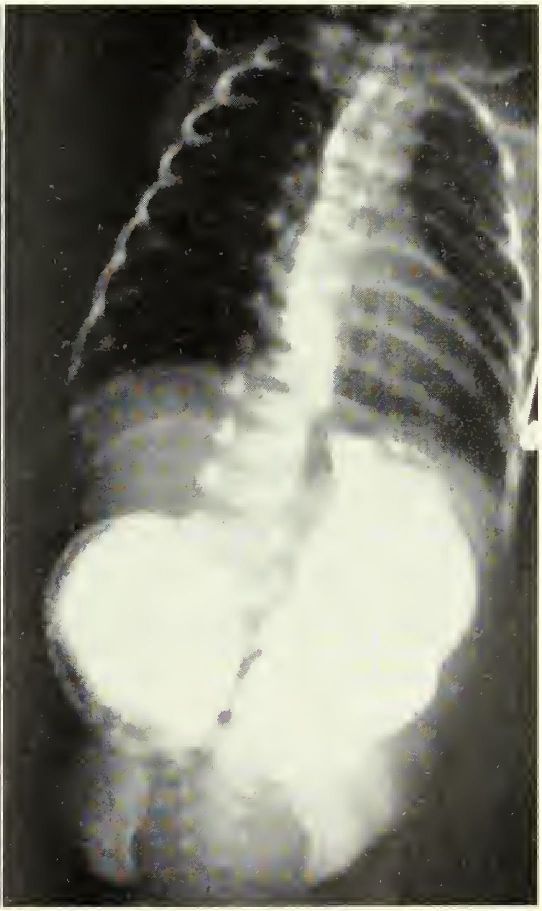


Fig. 2. Same, six hours later. Note complete retention of barium meal. Posterior gastrojejunostomy was done two hours later.

vomiting, which had now become projectile, and no stools, an X-ray examination was made, the barium shadow showing a dilated stomach and an enormously dilated first portion of the duodenum, which was completely closed at its lower end. Six hours later it was seen that none of the barium had passed through the distal end of the first part of the duodenum; all of it was still in the stomach and first portion of the duodenum (figs. 1 and 2).

Operation (by G.I.W.C.) was performed within two hours after the completion of the X-ray examination, using a high right rectus incision under local (novocain) anesthesia and sweetened whisky by mouth. The stomach and first portion of the duodenum were found as disclosed by the X-ray pictures. No evidence of the upper part of the second portion of the duodenum could be found. The jejunum was seen to be collapsed to an extent that its diameter was no greater than that of an ordinary lead pencil. A posterior gastrojejunostomy was thought to be the best type of operation for this particular case as it involved the least disturbance of the anatomical relations of the viscera, afforded the most dependent drainage of the contents of the stomach and duodenum and permitted the establishment of as long an anastomotic stoma as possible, having in mind the uncertainty of the opening increasing commensurately with the growth of the child. It was done with difficulty, on account of the smallness of the parts and the friability of the tissues, but a firm, adequate anastomosis was completed and the baby, which weighed five pounds and one ounce at the time of operation, was returned to its bed in fair condition.

The immediate postoperative course was stormy and attended with much vomiting. A gavage was done before each feeding and it was thought that some small amount of food was being retained and would go through but when at the end of twenty-four hours no stool appeared a barium enema was given and demonstrated the presence of a complete obstruction in the sigmoid flexure. A second laparotomy was therefore done, forty-eight hours after the first, using a muscle-splitting incision in the left lower abdomen, disclosing a tightly constricting band across the lumen of the sigmoid flexure. This was quickly divided and the abdomen again closed without drainage. Thereafter the baby began to have normal stools and relief from the vomiting. His weight reached a low level of three pounds and fifteen ounces but he soon began to gain and left the hospital on the tenth postoperative day weighing five pounds and nine ounces. In addition to the two lesions mentioned he was later found to have a symptomless heart murmur, an occult spina bifida which was also symptomless and a slight shortening of both tendons of Achilles. Regardless of everything he has gained steadily and for the past three years has led the life of a normal child of his age. A check-up examination made elsewhere on April 17, 1939, showed the gastrojejunal stoma to be working normally (fig. 3).

Complete congenital atresia of the duodenum, the major point of interest in this case, is a very rare anomaly, necessarily fatal if untreated and followed by a high mortality rate even when subjected to operation. Tallerman and Levi,[4] reporting a successful case of their own, had been able to find but six others in the English and American literature. Gastroenterostomy was the operation performed in all of these cases and it is advocated as the method of choice by Cole.[1] Others, notably Ladd[3] and Donovan,[2] both of whom report successful experiences with this method, prefer gastroduodenostomy. In the case just described in detail the operation of posterior gastroenterostomy seemed best for the reasons stated and the subsequent course of the case has given no reason for any regrets. There has been no digestive disturbance, nothing to suggest incomplete emptying of the stomach and duodenum and the growth and development of the patient has proceeded along normal lines, just as if nothing had happened in the first place.

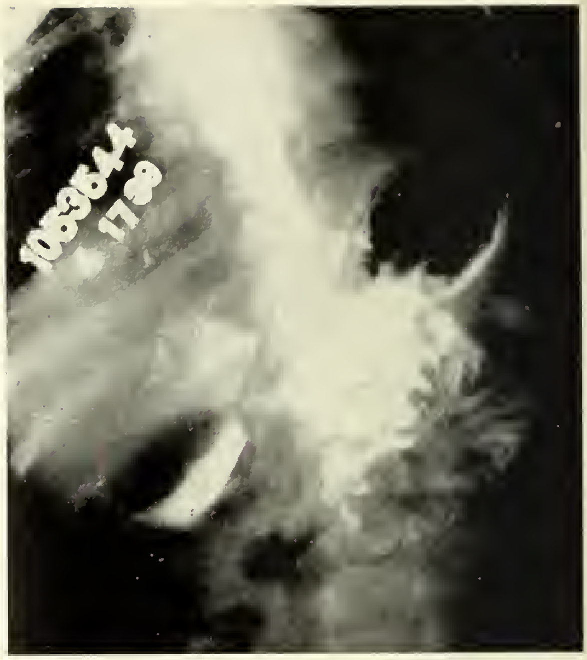


Fig. 3. Same patient at age of one year and eleven months, showing competency of gastrojejunostomy opening soon after taking barium meal.

REFERENCES

1. Cole, W. H.: Congenital malformations of the intestinal tract and bile ducts in infancy and in childhood, Arch. Surg. 23:820, 1931.

2. Donovan, E. J.: Congenital atresia of duodenum in newborn, Ann. Surg. 103:455, (March) 1936.

3. Ladd, W. E.: Congenital obstruction of the small intestine, J.A.M.A. 101:1453, 1933.

4. Tallerman, K. H., and Levi, D.: Duodenal atresia; gastroenterostomy; recovery. Proc. Roy. Soc. Med. 31:761, (May) 1938.

What the North Dakota Workmen's Compensation Bureau Expects of the Physician*

W. H. Bodenstab, M.D.†
Bismarck, North Dakota

UNDER the compensation statutes of various states, an employee receives a portion of his wages whenever he suffers an injury that arises out of and in the course of his employment and depreciates his earning capacity or causes disfigurement. It relieves the employer of the burden of common law liability, and in effect provides for the employee's dependents while his disability exists. The object is to compensate the injured person for loss of earning capacity temporarily and permanently, but it is not the purpose of the statutes to permit recovery of damages. The disabled employee receives compensation during his disability and a specified sum for loss of a member of his body or for specific injuries.

One distinct advantage of the compensation law is that it provides medical and hospital aid to the injured. Under the common law the employee was often treated as a pauper while the present system provides prompt and constant first aid together with medical and hospital expense regardless of the element of negligence. This feature of the law, in many respects, is more valuable to the employee than the compensation for the loss of his wages. The amount of money that is paid annually for medicine, hospitalization and compensation is almost beyond comprehension. It has been estimated by the United States Department of Labor that the average yearly cost for the entire country of compensable accidents is over $500,000,000, approximately $80,000,000 of which is for medical, hospital and administrative fees. Most states have a Commission or Board which administers the law. When an injury occurs it must be reported to the Commission by the employer within eight days. The physicians who attends the employee makes a report showing the nature of the injury, treatment rendered and possibility of permanent disability. In most states the Industrial Board or Commission is a fact-finding body and replaces the common law trial by jury in all cases arising under the Workmen's Compensation laws.

The North Dakota law provides that an employee has no recourse to the courts if the Board has assumed liability and paid compensation according to the recommendation of the attending physician and the Bureau's medical advisor. In case the employee is dissatisfied, he is usually called into the Home Office where he or she is examined by disinterested medical men who are especially qualified to diagnose and evaluate the particular complaints of the employee. The report of these men together with the recommendation of the medical advisor, and that of the attending physician, are then summed up by the Board and adjustment is made to the best of its ability. This factor does not seem to be generally understood by the medical profession because the Bureau frequently receives letters from doctors suggesting a cash settlement with the employee because the latter threatens to sue the Bureau.

The compensation law is greatly dependent on the medical profession for its successful operation. The duties of the physician are: *First,* to render first aid and report the case to the Commission; *second,* to render secondary treatment to successful termination of the case; *third,* to evaluate the amount of the permanent disability or partial permanent disability. Let me say here that the Commission is composed of men who are not physicians, but who must daily judge and interpret the reports and opinions of doctors. It is necessary, therefore, that scientific information should be recorded in as simple and as comprehensible language as possible. Accurate reporting of injuries is a troublesome burden to the physician, but the attending physician of any compensation case should recognize that this phase of the work is a legal requirement, established for the protection of the employee and employer. If a claim for permanent disability is later filed, much depends on the physician's first report.

In making the report of an examination of a person claiming disability there is one factor upon which depends greatly the physician's exposition of the case, namely: Is the disability claimed the direct and proximate result of the injury, or not?

The influence of trauma to disease is a complex subject in which the physician as an expert witness is often faced with the problem of offering an opinion with little authoritative background to buttress his argument. It is a tradition of the medical profession that its members should protect the state and society from imposition. The medical authority must have due regard for claims of the injured man, yet ever be alert to detect fraud, exaggeration or malingering lest it be a reflection on his probity. Unbiased and impartially, the physician must base the cause of a disability or the extent of its damage on his scientific knowledge and understanding of the facts of the case.

The North Dakota Compensation Law is built on the provision, "Disease or injury arising out of and in the course of his employment." That leaves a wide open concept, because disease may be produced by occupational pursuits or by inherent constitutional disorders, and the knowledge of medical facts is necessary to fix the cause. However, the average physician is not accustomed to being definite. In his practice he deals constantly with uncertainties; he is well acquainted with the perplexities of nature and human weakness, and must account for them. He often makes patronizing expressions, optimistic and sympathetic for the psychological benefit of the patient. When confronted, therefore, with a problem which has on the one side a claimant who expects monetary remuneration for damages to his body, and on the other side an employer who is forced by law to pay for such damages, the medical opinion immediately becomes valuable and all statements must avoid prejudice, error and false psychological impressions. We frequently hear the claimant say: "My doctor told me I would never get entirely over my injury." This is very poor psychology.

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*Read before the North Dakota State Medical Association annual meeting, Grand Forks, May 19-21, 1941.

†Medical director of the North Dakota Workmen's Compensation Bureau, Bismarck, North Dakota.

The question as to whether damage to the body tissues is due to an accident or due to some inherent constitutional condition often depends completely on the competency of the medical attendant. There have been numerous claims filed by employees suffering from apoplexy, coronary disease, pneumonia, appendicitis, etc., in which the attending physician substantiated the claims and gave the cause of the disease or death as the result of their employment. It is quite evident that a man with hypertension or arteriosclerosis may develop apoplexy from exertion or lifting weights, but when this stroke appears 24 or 48 hours afterwards, probably in bed while asleep, the possibility of connecting the employment with the disease is rather vague and farfetched.

Can trauma or strain precipitate thrombosis of a coronary vessel that is already sclerotic? Can a trauma or strain produce atherosclerosis of the coronary arteries? Hard physical work for many years has never been shown to have favored the onset of coronary disease—in fact there is some evidence to the contrary. Some of the healthiest aged people approaching the century mark in years have lived physically laborious lives, especially on the farms, and have never had any signs or symptoms of coronary disease. Whether or not mental stress may favor the onset of coronary disease we are not so sure although the fact remains that a majority of individuals with angina pectoris and with actual coronary thrombosis have been mental workers. Whether a disturbance of lipoid metabolism as claimed by some cardiologists is the cause of arteriosclerosis is still a questionable conjecture.

In 1939, I happened to look through the mortality list of physicians published in the *Journal of the American Medical Association* for January and February, and found that there were 528 deaths listed. In 15 per cent of these, no cause of death was given. Of the remaining 85 per cent 62 per cent died of cardiovascular disease, and of these 62 per cent, 24 per cent died of coronary disease. If we figure the 15 per cent not diagnosed on the same basis it would give us close to 30 per cent of the doctors having died of coronary disease.

Within the last year the Bureau has had a number of claims of coronary disease which, according to the physician and claimant, were brought about as the result of exertion such as lifting weights, climbing stairs, or mental excitement of one kind or another. These cases present quite a problem to the Board and a decision of dismissal is made only in cases which are without question that the employment was not responsible for the disease. All questionable cases are settled on the basis of aggravation of pre-existing conditions.

Pneumonia subsequent to injuries is very rare. According to Frankel, one to two per cent of the cases are due to the direct influence of an accident. In order to establish the relation between an injury and a subsequent pneumonia, it is necessary that the individual should have sustained a severe crushing injury or contusion of the chest; also, consideration should be given to the time of the appearance of the symptoms, and to the nature of the symptoms. The following types of injury may be considered adequate causes of pneumonia: namely, overstraining, severe exposure to heat or cold, inhalation of poisonous gases or dust, or aspiration of foreign bodies and puncture wounds of the chest.

The Bureau is constantly being confronted with claims where the employee contracted pneumonia during the course of his regular employment and he feels that the Compensation Bureau should take care of him. I feel that the case is not compensable if the pneumonia occurs while the person is engaged in his regular occupation. In the event, however, that there was some unusual insult such as being stuck in a snowdrift and digging out a car, or being exposed to extreme cold or wet, the claim should receive favorable consideration.

Acute appendicitis because of its frequencyy is probably the most important disease of the intestines. Its relation to injury is, therefore, exceedingly important. In attempting to evaluate the role of trauma in its causation, we must first try to differentiate the rupture of a normal appendix due to a direct bruise or laceration, or to a sudden increase in pressure within its lumen from the usual acute inflammatory disease of the organ, with subsequent rupture or perforation.

The incidence of relevant trauma in acute appendicitis has been very difficult to determine because the patients are usually too ill to give a reliable history. However, Levai in a series of 1,054 cases in which this point was carefully investigated was able to find but nine cases with such a traumatic history. The types of trauma were dull blows against the abdomen; falling from heights; overstrain from lifting, and stepping on the abdomen. These insults were not unusually severe and in each case the person continued with his work. One might, therefore, conclude that a normal appendix does not become inflamed as the result of an injury, but that a previously diseased organ may be activated to acute disease. However, that an isolated injury may result in direct perforation of a healthy appendix has been demonstrated in several cases. No case of alleged appendicitis should be compensable unless it is operated on, since a diagnosis would be too vague and uncertain unless verified by operation. Injuries to other intra-abdominal organs are quite rare and time will not permit a discussion of the different ones.

In closing, just a few words about occupational diseases. When the compensation laws of the various states in the Union were first enacted, occupational diseases were given no place. The benefits were confined to industrial accidents and their sequelae. Year after year, since 1920, the different states included occupational diseases in their compensation laws. A number of the states have special lists of diseases compensated for. Some of the states specify not only the disease but also the restricted processes in which it might be acquired in order to be compensated for.

The disease statute of the North Dakota Workmen's Compensation Act, which is not strictly an occupational disease statute, was first enacted in 1925. The statute as originally enacted read as follows: "The term 'injury' includes in addition to any injury by accident, any disease proximately caused by the employment."

This statute has been interpreted many times by the North Dakota Supreme Court and the main tenor of the opinion is that in order to have a disease compensable under the Workmen's Compensation Act that disease must come on as a proximate result of the employment. The courts have defined proximate as meaning "direct" or "main". It is, therefore, seen that in order to have a disease compensable, it must be a direct result of the employment or some circumstance in the employment and compensation cannot be paid where this is not shown. This statute was amended by the 1941 Legislature and the amendment merely clarifies and defines by statute the original statement as included in the Act heretofore. The new statute reads as follows:

"The term 'injury' includes in addition to any injury by accident, any disease which can be fairly traceable to the employment. Compensation shall not be paid, however, for any condition which existed prior to the happening of a compensable injury or for any disability chargeable to such condition. Ordinary diseases of life to which the general public is exposed outside of the employment shall not be compensable, except where said disease follows as an incident to and in its inception is caused by a hazard to which an employee is subjected in the course of his employment. A disease shall be deemed to be fairly traceable to the employment if there is apparent to the rational mind upon consideration of all the circumstances, a direct, causal connection between the conditions under which the work is performed and the disease, and which can be seen to have followed as a natural incident of the work as a result of the exposure occasioned by the nature of the employment and which can be fairly traced to the employment. The disease must be incidental to the character of the business and not independent of the relation of employer and employee. The disease need not to have been foreseen or expected, but after its contraction it must appear to have had its origin in a risk connected with the employment and to have flowed from that source as a rational consequence."

It will thus be seen that it must now be shown that the disease follows as a direct result of the conditions of the work and the causal connection between the two must be shown. The statement "which can be seen to have followed as a natural incident of the work as a result of the exposure occasioned by the nature of the employment" is a clear statement of the burden necessary.

The most common conditions experienced were lead poisoning and arsenical poisoning. Lead poisoning is acquired by painters and printers in this section of the country where there are so few industrial plants. I believe that a large percentage of cases of lead poisoning are not properly diagnosed; also, many cases diagnosed as lead poisoning turn out to be something else. Arsenical poisoning has been quite common in the last few years as a result of handling and mixing grasshopper poison. Most of the cases are of a chronic character and may assume one or a combination of three forms, gastrointestinal, nervous, and skin. We are interested only in the latter type in which skin eruptions appear. These may vary considerably from exfoliation of the skin and falling out of hair and nails, to the formation of keratosis and pigmentation. A history of exposure to arsenic with any of the above symptoms should warrant a diagnosis of compensable arsenic poisoning.

The Second American Congress on Obstetrics and Gynecology will be held in St. Louis, Missouri, April 6-10, 1942. This five day program will include general assemblies and individual group meetings on medical, nursing, public health and institutional administrative problems relating to the factual and scientific aspects of maternal and infant care. The problems will be presented by national authorities as scientific papers, demonstrations, round tables, and in addition, personal interviews and consultations.

The purpose of this Congress is to present a program of present-day medical, nursing and health problems relating to human reproduction and maternal and neonatal care through the avenue of scientific presentations.

Upon written application, arrangements will be made for the individual doctor attending this congress to present his particular obstetrical and gynecological problems to one of the men who will take part in the program.

Remarks on the Treatment of Fractures*

Don King, M.D.
San Francisco, California

IN the Orthopedic Clinic, we see many patients who have had poor fracture results; hence, over a period of years we are able to accumulate data on a considerable number of such cases. Analysis of such a group indicates that many of the poor results are directly attributable to factors over which the surgeon had no control. On the other hand, we cannot escape the impression that a certain number of these patients would have had better results with different treatment. The ensuing remarks are based on a consideration of the latter group.

The Compound Fracture-Wound

"To close or not to close . . ."

Hamlet's problems were never more difficult to solve than this which so often confronts the surgeon. As an illustration:

A sixteen year old girl suffered a compound fracture of the left tibia on Sunday afternoon. The protruding fragment was badly soiled and the soft tissues were extensively torn and lacerated leaving a large jagged wound. Within the hour she was in surgery having the wound cleansed, debrided, powdered with sulfathiazol and finally closed. Because of skin loss, counter incisions laterally were necessary to affect snug closure of the integument. Plaster fixation and anti-anaeorbic serum completed the immediate treatment. She felt very well on Monday and Tuesday, but on Wednesday evening the leg began to pain more than it had previously, and the temperature reached 102 F. Thursday morning she was seriously ill and was transferred to Stanford Hospital. On removal of the cast the leg was found to be terribly swollen, crepitating and gangrenous. When the stitches were cut the wound burst open spontaneously, expelling much gas. Amputation saved the patient's life.

During the past five years we have had 12 similar cases. The physicians providing the emergency treatment almost invariably stated that they had had great difficulty deciding whether to close the wound or not. Although it is impossible to definitely state that these tragedies could have been averted, still one has the uneasy feeling that these patients might have done better if the wounds had been left open.

These observations lead me to the following suggestion. Even though you are able to get your patient to surgery immediately, if there is extensive contamination, laceration and destruction of tissue, *do not close the wound tightly.*

Following cleansing, debridement and powdering with sulfathiazol, fill the wound with sterile vaseline gauze, apply gauze dressings and immobilize in cast or splint according to your individual skill and habit. If the wound remains clean, a secondary closure can be done in ten or fourteen days. If not, it can be allowed to heal slowly by granulation and creeping epithelialization as in a case of osteomyelitis (Orr method).

Short Casts for Long

One of the most common causes of redisplacement of a reduced fracture of ankle or forearm with resultant non- or mal-union is the use of a short instead of a long cast. If a short "to the knee" cast is used when *both malleoli* are broken, the foot and cast will slowly externally rotate, thus displacing the short malleolar fragments (fig. 1). This can be prevented by using a long cast well above the slightly flexed knee.

Short "to the elbow" casts allow pronation and supination movements and may be the direct cause of nonunion in fractures of the forearm (fig. 2). All fractures of both bones of the forearm must be treated in long casts from the palm of the hand to the shoulder. In the hand the cast is trimmed to allow full finger flexion at the metacarpo-phalangeal joints and we insist that the patient make a full fist several times each hour. He is also instructed to actively elevate the arm over the head several times each day. These exercises are invaluable in maintaining muscle and joint function.

Removal of Cast. There is *no specific time* for removal of the cast. It comes off when the fracture is *solidly united* by clinical and X-ray examination. Nonunion or angulation is often the price paid for undue haste. *When in doubt leave it on for an extra few weeks.*

Open Reduction

In his enthusiasm for securing anatomical reduction, the surgeon may do harm by unnecessary open operations. This is particularly true in children. Occasionally an operation will be required to replace a rotated capitellum humeri or radial head (fig. 3). Otherwise, I cannot think of any fracture in a child which requires open reduction. In the forearm, if the arm is straightened and immobilized in a long cast, healing will always occur and a perfect functional result will be obtained. Overlapping of the fragments at the fracture site is of no importance. The use of plates, wires and skeletal traction is mentioned only to be condemned.

In adults, open reductions are many times definitely indicated. If plates, screws, wires, etc., are employed they must be used correctly. Figure 4 is a good illustration of what might happen to a poorly applied bone plate.

Skeletal Traction. A perfectly healthy athletic high school boy of 18 caught the dorsum of his foot on the first hurdle. He fell forward on the palm of his right hand, sustaining a simple fracture of both bones of the forearm. One hour later under general anesthesia two pins were inserted, the arm placed in a screw traction machine, the fractures reduced and a cast applied. Per-

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*Read before the Montana State Medical Association, June 25, 1941.

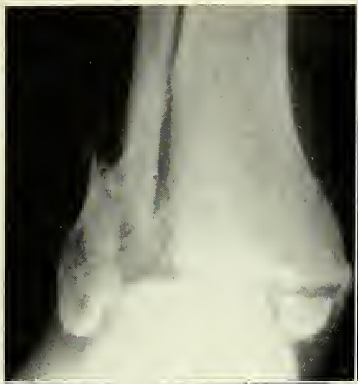
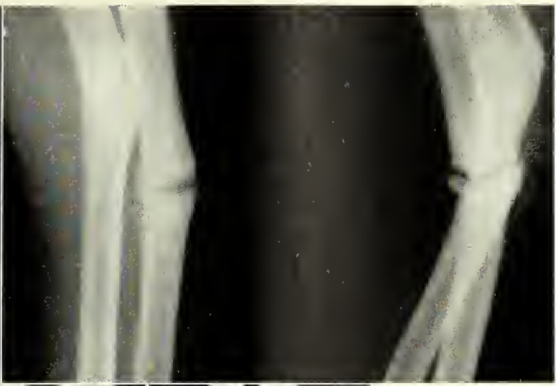
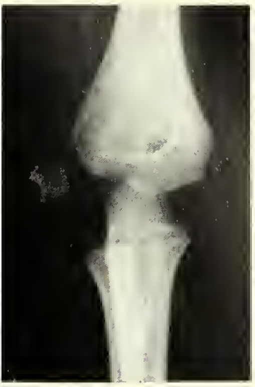
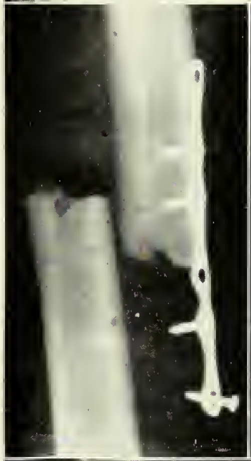
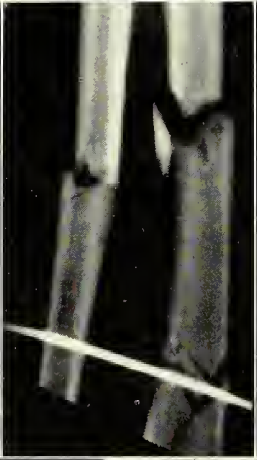
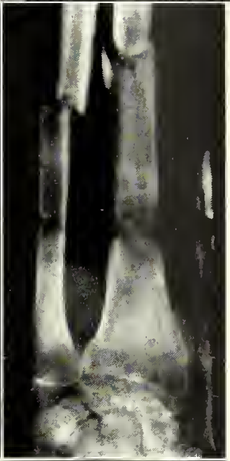
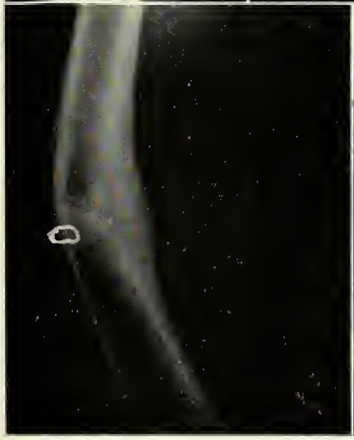
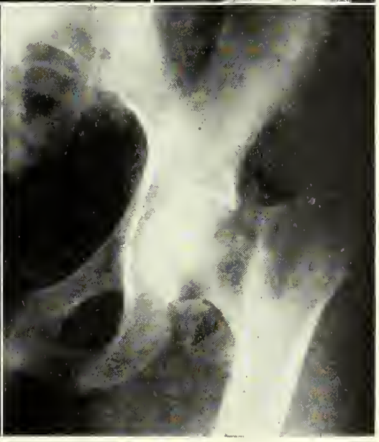

Fig. 1. Six weeks after perfect anatomical reduction, displacement due to short leg cast.

Fig. 2. Non-union of ulna and mal-union of radius, fracture both bones of forearm treated in short arm cast.

Fig. 3. (Age 6). Displaced and rotated capitellum is irreplacable by manipulation. Open reduction is necessary.

Fig. 4. Improper use of internal fixation. Screws should be long enough to grip cortex on both sides. Six screws should have been used.

Fig. 5. Non-union fracture radius and ulna resulting from too much skeletal traction (distraction). A—At time of "reduction". B—Twelve months after injury.

Fig. 6. Child 8 years old had open reduction of femur. This is **never** necessary. Weight bearing allowed in six weeks with resultant bowing.

Fig. 7. Shortening and coxa vara deformity (intertrochanteric fracture) from too early weight bearing (eight weeks).

fect reduction was secured and all went well for twenty-four hours. Sudden elevation of temperature associated with severe pain, swelling and chills necessitated removal of the cast. From a localized area of redness around one end of the distal pin ascending streaks of lymphangitis could be discerned. Death came in twenty-four hours from streptococcic septicemia.

Skeletal traction is invaluable in fracture of the femur in adults. It is never necessary in children. When in doubt, ask this question: Would you use it if you had the fracture yourself?

Use skeletal traction only when strictly indicated—and not too efficiently. By this I mean, *do not distract the fragments,* as this may result in non-union (fig. 5).

Traumatic Affections of the Knee Joint*

Edward Parnall, M.D.†
Minot, North Dakota

THE knee is the largest and strongest joint in the human frame, a veritable giant among joints. But like many giants, it has feet of clay: it suffers more wear and tear than any other joint, and with the exception, perhaps, of the ankle, is most subject to trauma. It is the most complicated of all the joints, having an elaborate system of ligaments around and within it, and possesses the largest area of contiguous articulating surfaces and synovial membrane.

It is the purpose of this brief paper to touch upon some of the commoner disabilities of the knee arising from trauma.

When one first sees an injured knee joint, one should remember that the visible response to an injury is not always an indication of its severity, since the synovia may produce an enormous effusion due to some minor though irritating contusion, and none at all following a serious cartilaginous tear. I have even observed a knee in which a .38 calibre bullet was lodged, which showed no swelling at all, nor any other response, save for the bullet-hole. Above all, except in instances of the most trivial injury, one should supplement one's clinical observation with a radiogram whenever possible. Time and again a distressing turn of events might be avoided by taking an X-ray film.

While the ligaments and capsule of the knee play a large part in maintaining its integrity as a joint, yet they are far from being self-sufficient in this regard. Just as a latch which holds a door shut needs a spring to keep it snug, so do the ligaments need the pull of muscles to keep them taut and toned, and to take up that slack which must exist in order to permit motion. The drawing (fig. 1) shows how the quadriceps muscle merges somewhat with the capsule for such a purpose. Illustrated also are the almost imperceptible thickenings in the capsule (well defined only in artificial dissections), the lateral ligaments. Within the joint are the two cruciate ligaments, preventing forward and backward displacement of the femur on the table of the tibia. Of all the binding structures of the joint, the most important is the great quadriceps muscle and tendon, then the hamstrings and gastrocnemius, and lastly the ligaments.

The bulk of knee injuries consists of ligamentous strains, without demonstrable gross tearing. Due to its architecture, and also to the fact that most sources of violence are to one side or other of the body, the knee is most subject to inward stresses, thus setting up an enormous strain in the internal lateral ligament, usually at an instant when the muscles are not prepared. The same sort of violence, if it has a twisting component added, with the foot held fixed, may strain the anterior cruciate ligament. Much less frequently, the posterior cruciate, then the external lateral ligaments are strained. With sufficient force, gross tearing may occur. Except in the latter eventuality, when obvious dis-alignment gives the clue, the swelling and other acute periarticular reactions will for the most part mask the extent of ligamentous injury. One, therefore, cannot make a complete appraisal of the damage until this has subsided.

First and foremost, such an injured knee should be put completely at rest, until a fracture can be ruled out —and many are the times when clinical diagnosis has been overruled by the roentgenologist. To set the knee properly at rest, one should use a splint, with upright foot piece, with a sufficient bend to keep the joint in about 20 degrees flexion. An ice bag may be applied. As the acute symptoms subside, and the patient no longer winces whenever he thinks someone is going to joggle his foot, walking with crutches may be allowed. During this period the knee can be protected by heavy strapping applied around the joint, above and below, over a light padding. A cast should really never be used, since rigid immobilization at this stage is very apt to result in considerable stiffening. After a time the crutches may be discarded, and weight bearing with the strapping alone permitted; and finally, all restraints are removed. Most important, early during the course of treatment, one should institute quadriceps exercises, teaching the patient to pull up on his patella slowly and tightly, and letting it go. Begin with a half-dozen times daily, and increase to 50.

Even when gross ligamentous tears are present, they will respond to the above treatment, and seldom need surgical repair. One definite exception is a complete or partial tear of the quadriceps tendon, which always requires repair of the most careful sort. This is beyond the scope of this paper.

Often the patient presents himself with a history of *old* injury, and complains of chronic ache and pain in the knee. Assuming for the moment that a torn cartilage can be ruled out by the absence of a story of locking, and a fracture ruled out by X-ray, one proceeds to examine the integrity of the ligaments by forcing the knee medially and laterally, and the tibia forward and backward. Gross hypermobility in any direction usually indicates a gross tear that calls for surgical intervention by means of any one of a number of ingenious operations. Usually, however, there will be no laxity, or at the most only a slight give on medial forcing with localized tenderness at the medial aspect of the joint. The quadriceps muscle will usually show some atrophy and loss of tone. This will be felt and seen, rather than demonstrated by girth measurement of the thigh. Usual diagnosis is sprain of the internal lateral ligament. Often the patient is provided with an elastic knee support and given local heat. The trouble with elastic supports is

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*Read before the North Dakota State Medical Association annual meeting, Grand Forks, May 19-21, 1941.

†Northwest Clinic, Minot, North Dakota.

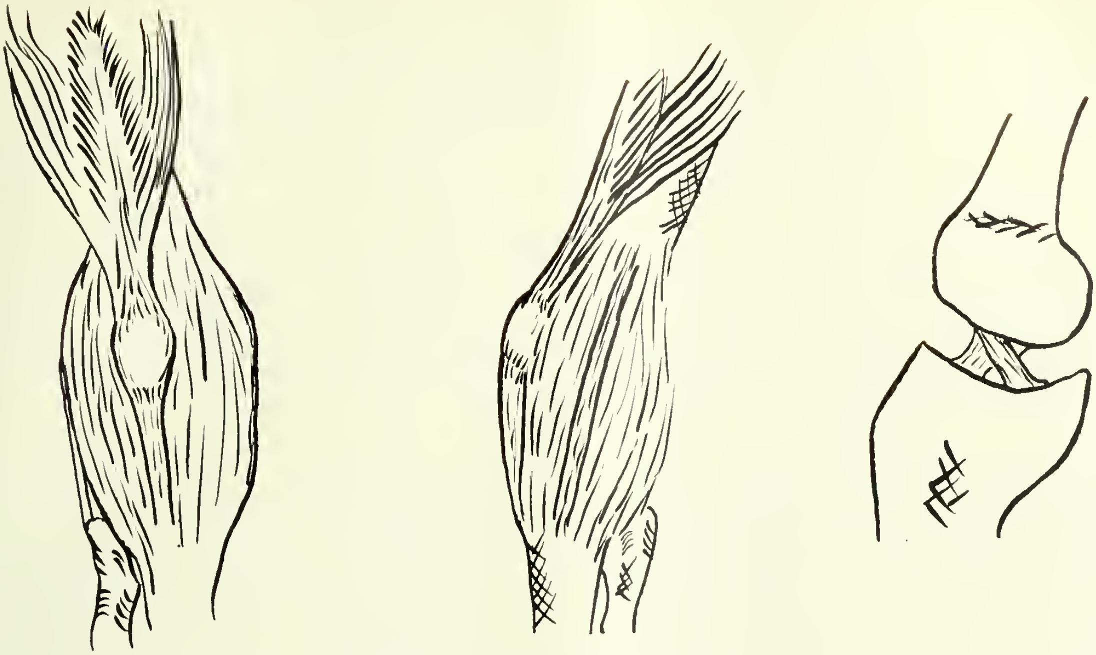

Fig. 1. Binding structures of the knee.

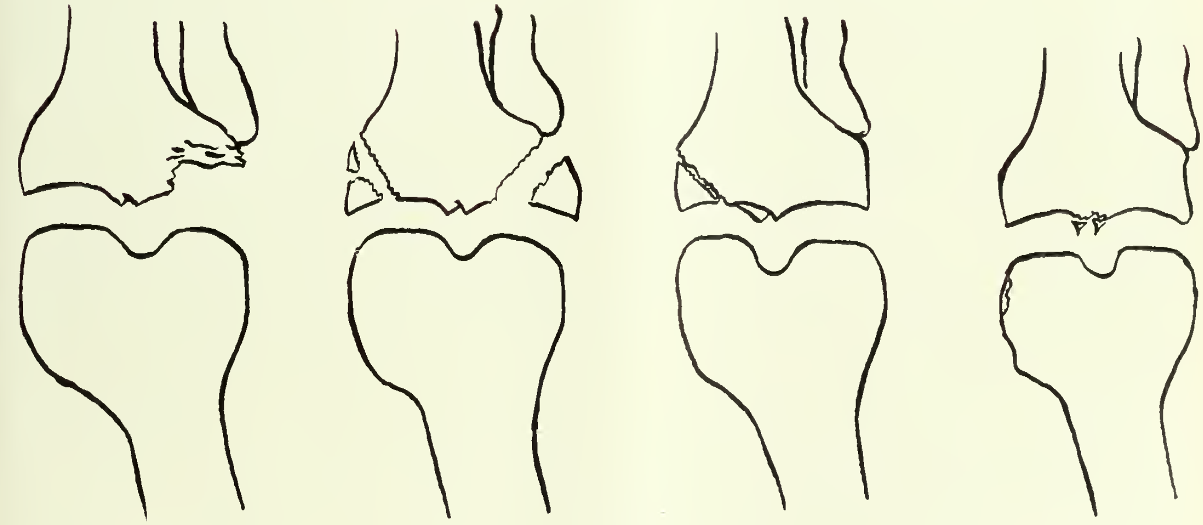

Fig. 2. Intra-articular fractures.

that they tend further to weaken the joint and cause increased muscle wasting, and heat is only temporarily comforting. The patient, of course, must be satisfied that something is being done, so that some form of heat (especially one of the various types of diathermy) and massage are quite helpful. One very useful method of taking some of the strain off the injured region is to provide the shoe with a Thomas heel, or at least to raise the inner border of the heel with a wedge lift of one-fourth of an inch. Most important, however, are quadriceps exercises, faithfully carried out. If he follows instructions, the patient will usually note improvement by the end of ten days to two weeks, and from then on will be quite enthusiastic. He must be told that he will have to do the exercises every so often for several years, since a chronically relaxed ligament or joint capsule is apt to recur unless special attention is paid to it. Many persons, particularly flabby women, will have to be taught this exercise in painstaking fashion. One may begin by telling them simply to sit, with their foot on a chair, and raise the whole leg with the knee extended. Once they catch on, they can easily do the exercise while standing.

Intra-articular fractures frequently complicate knee injuries. While fracture of the patella and certain fractures of the femur properly fall into this category, I am purposely omitting them, since they constitute topics for more lengthy discussion, and since I am considering only

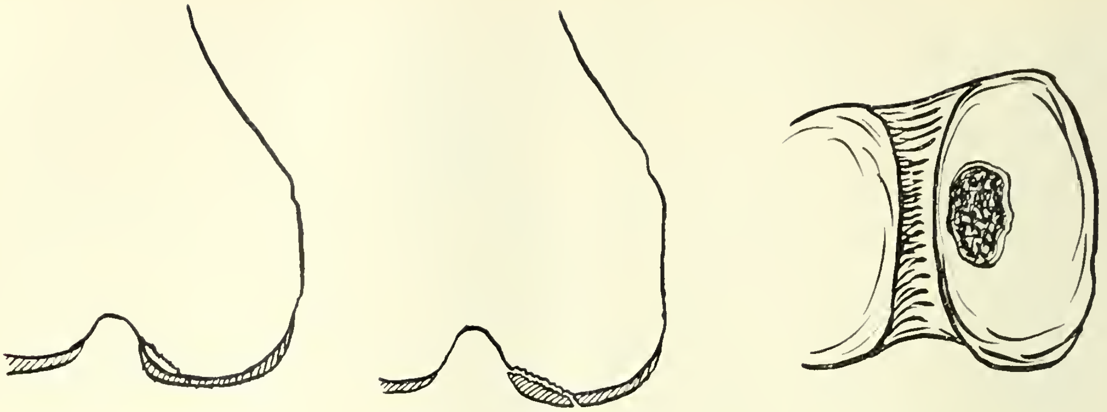

Fig. 3. Osteochondritis dissecans.

those which really complicate knee injuries per se.

Except for flake and avulsion fractures in the region of the femoral condyles, the tibia is nearly always the bone affected by reason of its vulnerable corners and spines. The drawing (fig. 2) illustrates the types: the tiny flake fractures of the femoral condyles, which clinical and even X-ray diagnosis often misses.

Fractures of one or both tibial spines are usually caused by a twisting type of violence as the patient slips and falls involving the cruciate ligaments. Proper diagnosis of course cannot be made except by X-ray.

Fractures of a corner of the table of the tibia without displacement are seen. One case observed had been treated by one of the cult practitioners and had been told that since there was no fracture, no X-ray was necessary.

Corner fractures of the tibial table with separation are found.

Depressed table fractures are usually the result of severe side thrust violence, such as the bumper of an older vintage of automobile.

Treatment of most of these fractures consists in partial immobilization in posterior splints or split casts. In corner separations, traction is usually of advantage. Prolonged immobilization is apt to result in considerable stiffening, and should not be used. Avoidance of weight bearing for six to eight weeks should be the rule. Even with rather pronounced corner separations, the results should be good. Table depressions are quite another story, and unless very mild, call for open reduction.

Cartilaginous injuries. Violence, which produces tearing of the semilunar cartilages, is often apt to cause no other evidence of damage than pain and locking of the joint. When the joint shows the ordinary signs of severe injury, these same signs frequently mask the internal derangement which later symptoms bring to light. Inasmuch as the treatment is always surgical removal once the diagnosis is established, I shall abstain from further discussion of it.

It is of interest to mention one sequel of knee joint injury simply that one may be on the watch for it. This condition, known as osteochondritis dissecans, may result from a single severe trauma or from repeated minor traumata. It has lately been proven that injury to the articular cartilage alone is more difficult of healing than injury to *both* cartilage and underlying bone (which incidentally accounts for the favorable prognosis of the fractures just discussed). When one considers the relatively greater prominence, when the knee is flexed, of the articular surface of the internal femoral condyle, as compared to that of the external condyle, one realizes how often it is subject to contusion when an individual falls down hard on one or both knees, lands hard on his feet, or otherwise is subjected to contusion-strains. Following recovery from the acute injury, the patient may complain of vague chronic pains, and of a tendency for the knee to "give way." The sequence of events may briefly be described as a subchondral bone necrosis, with gradually increasing separation of a button of cartilage (fig. 3) until finally the latter lies loose in a crater. Eventually it drops out of the crater and becomes a typical loose body in the joint cavity. If one has the condition in mind, this late eventuality, and its accompanying destructive effect on the joint, may be prevented. An X-ray will show a line of destruction along subchondral bone, usually on the internal condyle of the femur. At operation, the joint surface usually appears quite smooth and normal, but one boldly incises the cartilage and pops out the offending button, lightly curetting the underlying bone, in effect *completing* the injury into bone, and making healing possible.

In closing, I should like to acknowledge my appreciation for the help of Mr. Morton L. Nygaard, radiographic technician and photographer of the Northwest Clinic, who made the illustrations used in this paper.

Injuries of the Ankle*

J. C. Swanson, M.D.
Fargo, North Dakota

NEXT to fractures of the forearm of the Colles' type, the most common site of fracture in general practice is in and about the ankle joint. These injuries are usually due to twisting falls, and if bones are not fractured there is a severe type of sprain to deal with. These sprains should be protected for two or three weeks with a firm adhesive splinting to be sure that the ankle is stable, and to avoid recurrent sprains.

The fibulo-calcaneal ligaments once having been ruptured readily succumb to minor twists of the ankle and eventually a weak joint with permanent enlargement results. If fractures occur they are of three types: First, a simple fracture of the fibula in the distal end, usually oblique with very little displacement, or if there is displacement, it can be fairly easily corrected. The leg and foot are immobilized in plaster four to five weeks for healing. The line of fracture may appear open for a much longer period of time, but usually it heals without any permanent disability unless there has been a rupture of the fibulo-tibial ligaments and associated traumatic arthritis. This type of fracture may be associated with a small tip fracture of the tibial malleolus with a rupture of the tibio-calcaneal ligaments.

The second and most common fracture, of course, is the Pott's fracture or the bimalleolar. This involves the distal third of the fibula and the internal or tibial malleolus with external dislocation of the foot on the tibia. The fibula is fractured transversely or obliquely about 3 inches above the ankle joint. The lower fragment is displaced outward and backward, and the body of the astragalus and the foot are dislocated outward and backward. The internal malleolus of the tibia may be broken loose and displaced downward and forward, or the internal malleolus remains intact, the internal lateral ligament being torn. There may also be a tear of the tibiofibular ligament with separation of the two bones. This gives a grotesque appearance to the foot which is displaced outward and backward, making the lower extremity of the tibia very prominent.

Unless reduction is perfect, permanent disability with pain and lack of endurance may be expected. The heel and forefoot are grasped by the surgeon, and the dislocation of the ankle reduced by a forward push upon the heel; the foot is then sharply inverted at the subastragalar joint, but not at the mid-tarsal joints. Roentgenograms, both antero-posterior and lateral views, are made which should show the restoration of the normal relations; the astragalus must be reduced to its normal position between the malleoli, the line of the ankle joint must be transverse to the long axis of the leg, and the inner aspect of the astragalus must lie in close approximation to the outer surface of the inner malleolus. The position of the foot at right angle to the leg and strongly inverted must be maintained. There are numerous methods of retention, but probably the simplest is a cast extending from the toes to just below the knee, or if the patient is very obese the cast should extend above the knee which is flexed. Frequent control roentgenograms are made to confirm the position of the fragments; the slightest displacement demands re-manipulation. In those in whom the internal lateral ligament is ruptured, retention is more difficult than when the internal malleolus is broken; also, great care must be taken when the tibio-fibular ligament is torn to prevent widening of the mortise of the ankle joint. Physiotherapy may be instituted at the end of three or four weeks. Weight is borne at the end of six weeks by the aid of an arch support and an ankle brace, as valgus deformities may arise if callus is not sufficiently solid and strong to prevent deviation.

The third type of fracture about the ankle joint is a Cotton or malleolar fracture. This fracture involves both the malleolus of the tibia and the shaft of the fibula about 3 inches above the malleolus together with the posterior tip of the tibia. The reduction of a tripolar fracture is dependent upon the amount of the posterior part of the joint which is fractured. If the fracture involves only a part of the posterior tip it is similar to a Pott's fracture and requires only a little more attention than the bipolar type of reduction and immobilization. If the fracture involves 50 per cent of the weight-bearing surface of the joint, closed reduction is possible, but usually always fails. Even though the dislocation is reduced, X-rays taken through the plaster cast will reveal that the position has slipped. This fracture practically always has to have an open reduction and a nailing or fixation of the posterior pole.

Malunited fractures of the Pott's or Cotton type produce marked joint disability with pain and gradual loss of function, and require either open reduction of the fracture or an osteotomy through the supra-malleolar portion of the shaft in order to correct the weight-bearing line through the joint.

Fracture through the epiphysis in the very young should be corrected anatomically in order not to interfere with the growth of the bone. In considering injuries in and about the ankle joint, one must include the os calcis and the astragalus. Fractures of these bones are usually caused by crushing forces either in falling and landing directly upon the feet or in twisting or rotary motions of the foot. The fractures of the os calcis are varied and often present a difficult surgical problem. These fractures may be very slight, and, being without displacement, may not be noticed for several weeks after the accident has elapsed when the pain and disability are aggravated. Many of these are the impacted type with crushing of the bone and displacement of the posterior portion upward and outward so that the mass of bone appears beneath the external malleolus. Many of them are fractures with the comminuted line extending in all directions. These are particularly disabling when the fissures extend into the calcaneo-astragaloid articulation. The fracture is often caused by a fall from a great height, and frequently both os calces are involved. In taking the X-rays the lateral view is easily secured, but an effort should be made to secure a supero-inferior view by taking the X-ray at an angle through the sole of the foot aiming through the knee.

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*Read before the North Dakota State Medical Association annual meeting, Grand Forks, May 19-21, 1941.

The prognosis regardless of the method of treatment should be guarded, and there is often permanent disability. The disability usually depends upon the amount or lack of involvement of the calcaneal joints. The cause of the disability usually is a secondary arthritis and a traumatic flatfoot. Reduction should be attempted by the use of a redressor of the Boehler type, or by the use of a small curved vise using felt pads to protect the soft tissues. Accurate reduction is often impossible, but may be accomplished by forcibly plantarflexing the foot and flexing the knee to relax the tendo achillis. The outward displacement must be reduced and the inward curve of the normal os calcis restored; the upward displacement of the posterior fragment must also be corrected to restore the proper alignment of the longitudinal arch. If the closed methods are not successful, open reduction and nailing of the os calcis should be resorted to. This could be accomplished at once rather than an attempt made at skeletal traction to reduce the fracture. However, in spite of all these treatments a definite number of these have persistent pain which can only be relieved by a calcaneo-astragaloid fusion.

Fracture of the astragalus is caused by a similar force and the prognosis here is also unfavorable, although not so poor as in the fracture of the os calcis. Fortunately many of these fractures are mild and do not cause a great deal of trouble and the treatment depends upon the location of the fracture, whether in the head and neck, through the body, or through the posterior extremity. Fractures of the neck of the astragalus are similar to fractures of the neck of the femur in that nonunion and atrophy of the head may result even after reduction. Fractures of the neck of the astragalus may induce inversion of the foot because the rotation of the head causes permanent deformity. After reduction the foot is placed in extreme dorsiflexion as this position maintains the fragments in close apposition and position for healing by a plaster cast.

In severe compression fractures with comminution of the body of the astragalus, the astragalus will have to be completely excised and the foot placed in such a position that the malleoli grasp the anterior extremity of the os calcis, thus forming a new joint between the superior surface of the os calcis and the lower extremity of the tibia and fibula, throwing the balance of weight over the center of the foot. Fractures of the posterior extremity of the astragalus are caused usually by forced plantarflexion. The treatment consists of immobilization until acute symptoms subside followed by physiotherapy. In this connection one must remember that numerous supernumerary bones and sesamoids are frequently mistaken for fractures. One lies posterior to the astragalus and is often mistaken for a fracture of the posterior extremity of the astragalus. The accessory scaphoid bone in the tibial anticus tendon may be confusing, and also is frequently mistaken for a fracture. Likewise the anterior calcaneus which lies anterior to the os calcis is often diagnosed as a fracture. These are the most common, and unless the X-rays are studied carefully may lead to errors in diagnosis.

CONCLUSION

Fortunately, with the X-ray and with surgery these injuries about the ankle joints are causing less permanent disability than formerly. With adequate reduction and fixation followed by protection and physiotherapy continued improvement in results can be expected.

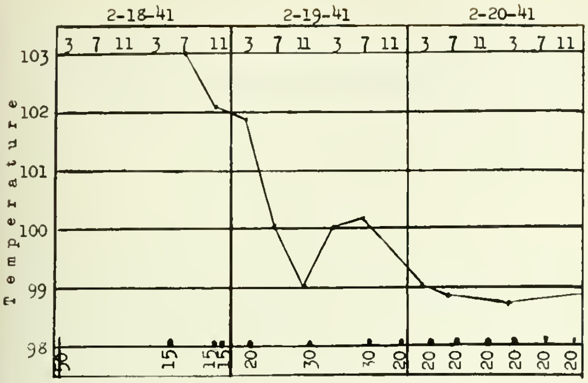
Sulfanilamide in Influenzal Meningitis*

Report of a Case with Rapid Recovery

Milton Levine, Ph.D.
C. G. Polan, M.D.
Minneapolis, Minnesota

THE use of sulfanilamide in the treatment of meningitis due to *Hemophilus influenzae* has yielded results which have been reported as unsatisfactory. Neal,[1] using a combination of sulfanilamide and prontylin, found no indication of a curative effect with these compounds. In a later paper,[2] she confirmed this earlier finding, after using sulfanilamide and azosulfamide on an additional small series of cases. Sulfapyridine, on the other hand, has given somewhat better results, although in the published evidence[2,3,4] the picture is complicated by the administration of immune serum with the drug in a large percentage of the cases. One must conclude from all the available evidence that there is not sufficient material to indicate the relative merits of the various sulfonamide derivatives. Alexander[5] has obtained suggestively good results with a combination of sulfanilamide or sulfapyridine and

*From the department of bacteriology and immunology and division of neuropsychiatry, University of Minnesota.



Oral dosage of sulfanilamide in grains. Dosage remained gr. 20 every 4 hours until February 22, gr. 15 was given every 4 hours on February 23, then gr. 15 every 6 hours until discontinued on March 11.

immune serum (concentrated and unconcentrated). Her comments on the chemotherapy of these infections indicate the problem involved in drawing any conclusions as to the value of this type of therapy in influenzal meningitis:

> Verbal reports from one institution indicate superiority of sulfathiazol and from another that results of mouse protection tests with all the drugs were so discouraging that that form of therapy has been discontinued in influenzal meningitis. Our own clinical experience fails to show a difference between sulfanilamide and sulfapyridine (sulfathiazol has been used in two patients, only one of whom recovered). Until the question of permeability of the meninges for sulfathiazol has been more thoroughly investigated, this drug should not be used in meningitis.

We are reporting a case which showed remarkably rapid remission of symptoms after the oral administration of sulfanilamide, illustrating unequivocally the beneficial action of this compound even when used without immune serum.

A 19 year old white male was admitted to the University Hospital Neurological Service on February 18, 1941, with complaints of headache, stiff neck, fever, projectile vomiting, and lethargy. A history was obtained that three weeks prior to admission, the patient had a head cold associated with coryza, sore throat, and sneezing. However, he was not confined to bed and was able to do some chores on the farm. The night of February 15th, he complained of severe generalized headache, which became more severe on the night of the 16th. On February 17th, stiff neck was present, in addition to headache. On the 18th, he became restless and at times lethargic. There were two episodes of projectile vomiting.

On February 18th, the day of admission, the patient was given 50 grains of sulfanilamide at 1:40 P. M., and 15 grains at 5 P. M. by the local physician. On admission, he had a blood sulfanilamide level of 5.4 mg. He was lethargic, dehydrated, but fairly coöperative. A bloody post-nasal discharge was present, the nasi communis meatus being filled with blood-streaked mucus. The nose and throat consultation impression was that there was probably a bilateral pansinusitis. Examination of the ears was negative. The neck was stiff. Kernigs were probably positive. Fundus examination revealed dilatation and tortuosity of the retinal veins. The discs were pink and had indistinct margins. The pupils reacted adequately to light. There was an absence of all deep reflexes. The abdominals were decreased on the left. The Babinskis were negative. There were no paralyses or pareses. Coördination was intact. Muscle and tendon pain somewhat decreased. Temperature was 103°, pulse 64, respiration 20. Spinal fluid was colorless, very cloudy, showing a pressure of 14 mm. of mercury with normal dynamics. Cell count was 2700 with 80 per cent neutrophiles. Proteins were 85 mg. per 100 cc., spinal fluid sugar 61 mg., chlorides 668 mg. Serology for syphilis was negative. The portable bedside X-ray film was negative, and smears from the spinal fluid sediment were negative for organisms. In view of the above findings, a diagnosis of acute meningitis, type undetermined, was made.

Sulfanilamide was administered as indicated on the chart. The blood culture taken on February 18th was sterile. The specimen of spinal fluid taken on the 18th later yielded *Hemophilis influenzae** on culture, permitting a definite diagnosis of influenzal meningitis. There was little stiffness of the neck on the 20th and no confusion. The headache disappeared after 36 hours in the hospital. The spinal fluid on February 26th was under pressure of 4 mm. of mercury, contained 37 cells, 5 of which were neutrophiles. Protein was 84 mg., sugar 78 mg., and chlorides 764 mg. The patient continued to be comfortable and was discharged on March 17, 1941.

Discussion

The rapid remission of the symptoms points to the efficacy of the sulfanilamide in this patient. The factors influencing the final successful outcome of this case are, first, the age of the patient, the mortality being lower in the adult group than in the infant group, and secondly, the early administration of the sulfanilamide. The marked beneficial results indicate the necessity for further trials of sulfanilamide in this disease before its use is abandoned in favor of newer sulfonamide derivatives.

It is somewhat difficult to explain the inequality of the deep and superficial reflexes. In conjunction with these reflex anomalies, as noted in the neurological examinations, there was no evidence of weakness, nor any pathological reflexes. The significance of these findings remains in question.

References

*The identification of the organism was verified by Dr. Hattie E. Alexander of the College of Physicians and Surgeons, Columbia University.

1. Neal, J. B.: The treatment of acute infections of the central nervous system with sulfanilamide, J. A. M. A. 111:1353, 1938.

2. Neal, J. B., Appelbaum, E., and Jackson, H. W.: Sulfapyridine and its sodium salt in the treatment of meningitis due to the pneumococcus and Haemophilus influenzae, J. A. M. A. 115:2055, 1940.

3. Noone, E. L., Kennedy, P. J.: Influenzal meningitis—report of two cases with recovery, J. A. M. A. 115:2060, 1940.

4. Neff, F. C., Hamilton, T. F.: Influenzal meningitis with bacteremia, treated with sulfapyridine: recovery, J. A. M. A. 113:1123, 1939.

5. Alexander, H. E.: Treatment of bacterial meningitis, Bull. New York Acad. of Med. 17:100, 1941.

The College Health Program and National Defense Optimum Health for All Students*

Colonel Leonard G. Rowntree, Med-Res.†
Washington, D. C.

SELECTIVE Service appreciates the privilege of discussing with you the subject of "The College Health Program and National Defense." Such a program should envision "*optimum health for each and every student.*" It should, however, reach out still further and attempt to formulate plans that will tend to lift national health to a higher plane.

So far as I personally am concerned, there is no other organization which I would prefer to address at this time, nor is there any other subject which I would rather discuss. For me this occasion spells opportunity; an opportunity for which I wish to express my gratitude to your president, and to your Program Committee. One reason that I am so pleased to address you at this time is that Doctor Boynton is in charge, and I can see a *job* which I believe she and you can do. We in Selective Service are greatly indebted to Doctor Boynton and Dr. Harold Diehl for the splendid work that they have done in the fields of prehabilitation and rehabilitation among the students of the University of Minnesota. Many months ago, a report of their work came to my attention which impressed me so favorably that I requested them to prepare it for publication. In fact, I wrote personally to the *Journal of the American Medical Association*, asking them to publish this article and include it as one of the contributions to our plan of prehabilitation.

Selective Service is indebted to the University of Minnesota in two other respects. Dr. Harold Diehl, Dean of the Medical School, has functioned with Selective Service as one of our Advisory Committee in matters pertaining to medical schools and the deferment of medical and dental students. In addition, Acting President W. C. Coffey prepared a statement for the students of the University of Minnesota last fall, entitled "Physical Fitness Challenges Men Students," which presents the subject so effectively that we requested several copies for distribution to the various divisions at Selective Service National Headquarters. You can see, therefore, that our indebtedness to the University of Minnesota group is great indeed.

And now for our subject. We are now at war—total war; war which demands an all-out effort on the part of each and every individual in this country. We must win. We cannot afford to underestimate the "will to win." This country needs everything that it has at its command, and above all else it needs manpower for the fighting forces—healthy young men who have "what it takes."

The statistical surveys of Selective Service reveal some fundamental weaknesses in the youth of this country—defects, deficiencies, disorders and diseases, all of which tend to curtail efficiency and constitute handicap. A rejection rate of 50 per cent means a curtailment in manpower of 50 per cent. It is not fair, however, to regard this as evidence of invalidism or actual sickness in 50 per cent of the youth of the nation. Nor is it fair to accept it as indicative of 50 per cent of invalidism among the people in the country as a whole. It merely means that 50 per cent fail to attain the standard requirements of our Army. It is only fair to say further that perhaps in any country of Europe, a large percentage of those rejected by us would have been accepted for military service. It is just and right also that we realize that the 50 per cent accepted, represents the finest manhood found in any Army anywhere in the world today. Men must be really fit to serve in the United States Army.

But, perhaps before discussing his deficiencies and defects, you would like to become better acquainted with Mr. Average Registrant: He is 25.7 years of age, 5′ 7½″ tall, and weights 150 pounds. His Dad, who fought for this country in the first World War, was 5′ 7½″ tall and weighed 142 pounds. His great grandfather, who fought in the Civil War, was 5′ 7½″ tall and weighed 136 pounds. His Canadian cousin, a soldier in the Army at the present time, is somewhat shorter, 5′ 6⅔″ tall, weighs 145 pounds and is somewhat younger, 22.5 years of age.

The fact that the registrant today weighs fourteen pounds more than his great granddad seems to indicate that he is not underfed and certainly lends no support to the widespread notion that the youth of the nation is suffering from undernourishment or malnutrition. It is questionable, however, whether this fourteen additional pounds he carries should be regarded as an asset. In most instances, it represents fat—not muscle. In all probability it indicates over-indulgence in food, lack of physical exercise and too much time in the automobile. Our great grandfathers led a more strenuous outdoor active life and at 136 pounds were as fit, if not more fit, than our young men of today.

Many of the defects discovered by Selective Service are easily remedied. By some they are regarded rather lightly. However, any situation which reduces manpower by 50 per cent constitutes a problem of national importance and concern and calls for immediate investigation and prompt remedy.

Selective Service to date has registered seventeen and a half million men, has examined two million registrants, and has seen inducted into the Army one million selectees representing "tops" in American manhood—physically, mentally and morally. On the other hand, one million men were rejected—

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*Read before the twenty-second annual meeting of the American Student Health Association, at the Hotel New Yorker, New York City, December 30, 1941.

†Chief, Medical Division, Selective Service System.

100,000 for educational illiteracy.
900,000 for physical or mental defects.
470,000 were classified I-B; that is they would be satisfactory for limited service were they acceptable to the Army. Under present conditions, however, they have been disqualified.
430,000 are disqualified for any type of military service.

When we break down these rejections relative to cause, we find that dental defects account for 188,000; defective eyes, 123,000; cardio-vascular diseases, 96,000; musculo-skeletal, 61,000; venereal diseases, 57,000; nervous and mental disorders, 57,000; hernia, 56,000; ear diseases and defective hearing, 41,000; flat feet, 36,000; diseases of the lung, 26,000; miscellaneous diseases, 159,000.

A study of the incidence of defects indicates that more than 25 per cent of this group were practically perfect and show no defects whatever, while another 25 per cent had at least three defects. The average for the group as a whole was 1.4 defects per individual, and the average for groups showing defects, was 1.9 per individual.

Age is extremely important in considering defects. At 21 years of age, 70 per cent, or 7 out of 10 presenting themselves, were accepted. At the age of 36, less than 30 per cent, or only 3 out of each 10 presenting themselves, were accepted. Race showed no significant difference. Acceptance among the whites ran 2 per cent higher than among the negroes.

The current situation as revealed in these figures proved a matter of grave concern to the President, who on October 9, called to the White House those most vitally concerned in this matter. He discussed the problem with insight and feeling and outlined a Program of Rehabilitation. This program provided that 200,000 in the Class I-B group be rehabilitated for service in the armed forces and that this program be carried out by Selective Service in the registrant's home community by his family doctor and dentist as far as possible, in conjunction with the local and State medical and dental organizations. The rehabilitation was to be effected at a reasonable cost for which, he said, funds were to be provided.

Subsequently, a conference of all those most vitally concerned in health and physical welfare and representing the most outstanding organizations in the country was called at Selective Service Headquarters to discuss policies and principles—ways and means. At this meeting, the opinion was developed that widespread resort to surgery presented many major difficulties and carried considerable surgical risk. Immediately following this, a second meeting was held with the Surgeon General, who gave us the benefit of Army experience in the matter of rehabilitation. Naturally, Selective Service prefers to let experience be its guide.

Some diseases are considered more favorable for rehabilitation than others. Among those easy of remedy, dentistry offers the best possibility since it seems that at least 100,000 of our rejectees can be rehabilitated satisfactorily and without danger. Perhaps 5,000 to 10,000 more suffering with diseases of the eye and defective vision can be salvaged, and a larger group, perhaps 10,000 allegedly suffering from cardio-vascular diseases. It is believed that many of those rejected earlier because the pulse rate was too high or too low, or because the blood pressure was a little above or below normal, might qualify on a second examination. It was also felt that some cases with extra systoles and inconstant systolic murmurs might be found acceptable. In the field of venereal diseases, some are acceptable; others not. The Army objects to taking those infected with syphilis, but it seems probable that a large group of perhaps 10,000 to 15,000 suffering with uncomplicated gonorrhea might qualify. In addition, it seems likely that at least 20,000 showing mild degrees of overweight and underweight can be salvaged. Perhaps 50,000 others, suffering from miscellaneous deficiencies and defects, can be made available to the military forces.

The unfavorable group for rehabilitation includes those suffering from nervous and mental diseases, from syphilis, and from diseases of the ear and defective hearing, from diseases of the lung and tuberculosis. Rehabilitation in these diseases will not be attempted. Surgery will be avoided for the present at least, except in the simplest of conditions, where it is specifically requested and where the registrant is willing to assume full responsibility.

Definite detailed plans for rehabilitation have been worked out already by Selective Service but they have not been released as yet. It is hoped that in the near future, this program will be well under way.

The opinion of the Medical Division of Selective Service is that the President's Plan of Rehabilitation presents a golden opportunity for the medical and dental professions; to see not what they can get out of it, but to see what they can put into it in the way of service. The rehabilitation program represents a big job and a great responsibility, and, as set forth by the President, a real compliment to the medical and dental professions.

It is obvious that if defects are so prevalent among the young men of military age, they must exist in a large percentage among all the people in this nation. In this connection, an unusually informative study was carried out recently by Dr. Ruth Boynton and Dr. Harold Diehl of the University of Minnesota. This study revealed the fact that of the students in the University of Minnesota, 29.5 per cent failed to qualify and would have to be placed in either Class I-B (21 per cent), or Class IV-F (8.5 per cent). This figure, 29.5 per cent, is practically identical with 29.7 found by Selective Service for registrants of similar age, 21 years.

The President's Plan provides for the rehabilitation of 200,000 men for service with the armed forces. It does not, however, solve the much greater problem of the lack of physical fitness and the prevalence of deficiencies and defects among the civilian population as a whole. In this connection, Selective Service has offered its own plan—the Plan of Rehabilitation which provides for:

(1) a campaign of education concerning the standard requirements in the Army, and

(2) the examination by the family doctor or dentist of those men who fall short of these requirements

(3) the correction of remediable defects found, by the doctor or dentist concerned and on the usual doctor-patient relationship, and

(4) the certification of prehabilitation by the doctor responsible for the correction of the defects.

This Plan invites every registrant and every young man in the nation to fit himself in advance for examination and, if acceptable, for service. It emphasizes the importance of not permitting minor defects to defeat major objectives. It is particularly applicable in universities and colleges, the schools all over the country, and also in labor and industry. The fact that defects are rampant as evidenced by the surveys at the University of Minnesota, indicates a widespread need for improvement in physical fitness and in health.

Because physical defects are rampant among the students on the campus, you have an unusual opportunity facing you in the universities of the country at this time. After all, your universities represent in certain ways the culmination of education. Hence, the survey at the University of Minnesota would seem to indicate that students carry practically all of their physical defects with them through the grade and high schools and bring them on with them into the university. In other words, since university students have relatively as many defects as the other young men of the same age group who have left school at various stages of their education and have gone into employment, it would appear that our educational system has failed either to recognize or to eradicate defects, or to build up health and physical fitness.

In virtually every university, you have a Student Health Service, which functions to supervise and preserve the health of the students. These Services were inaugurated some 22 years ago under the leadership of an old friend of mine, Dr. John Sundwall, who was aided and abetted in the project by Dr. Warren Forsythe. These Student Health Services have sprung up throughout the entire country, and have become very popular which reveals at once both their need and value.

To me it seems possible, now that we are at war, that these Student Health Services might be made to fulfill a much larger function than they have in peace time. Potentially, these student health organizations can command virtually all the services of the medical personnel and facilities in the universities of the country. They can corral the services of the medical schools and their faculties, the dental schools and their clinics, the hospitals and their staffs, the schools for nursing, the nurses and dietitians, the departments of public health and their laboratories, the departments of physical education and athletics, the departments of social sciences and also the services of the agricultural schools so fundamentally interested in matters of metabolism and nutrition. With the backing of the universities, their faculties, their research facilities and the alumni, the Student Health Services can provide unique, professional leadership in all matters pertaining to health and physical fitness of students and can educate therein the educators of the country.

You have gathered here today as representatives of these Student Health Services. To you is designated the function and the authority to supervise and preserve the health of the students. So far as I can learn, you represent the only organization so designated and so authorized. Consequently, you are in a most advantageous position—in fact, a unique position—to deal with the problem of student health. I question, however, whether many of you have actually grasped the potential power at your command.

May I suggest to you a plan whereby I believe that it is possible for you to increase your power materially and to use it more effectively. In every university, the Student Health Service might well take the initiative in setting up "A War-Time Intramural Student Health Council" which should include representatives from all of the schools and departments listed above. The Student Health Service might then register, examine and classify all male students, using as standards those of Selective Service and the Army. This council might then make a survey of the results of examination of the university students and apply measures of prehabilitation and of rehabilitation as they are found to be indicated. Thus remediable defects of the students might be recognized and eradicated. The Student Health Service should deal primarily, of course, with university students, but the system employed should be permitted to percolate down through the educational system as a whole, so as to apply eventually to high schools, grade schools and to students generally.

Such a war-time student health council might well function within each State. It might act on request and in an advisory capacity to all other State medical organizations interested in National Defense. Such a council could also be intercollegiate in nature, thereby forming a chain of war-time councils throughout the length and breadth of the land.

Your organization is concerned primarily with student health, but you also constitute an integral part of the educational system. As such, you should be interested in education itself. The greatest fault in our nation's system of education today lies in the field of physical education, by the lack of adequate attention to health and physical fitness of the students. It seems to me that in this matter also, you have a great responsibility. It should be yours to see that education not only cultivates the mind but adds strength to muscles, enhances the "will to win" and contributes iron to the constitutions of students for the creation of men of steel. Should this, or should this not, be part of your function? In your war-time council on student health, physical training, athletics and recreation should find adequate representation. For years, physical trainers in universities have advocated that more attention be given to the physical development of students. Their pleas have fallen mostly on ears that are deaf. Perhaps, you will be in a position to aid them materially in their program. They need your help and I feel certain they can profit from it.

Tonight it is to be my privilege to speak before the New York State Association for Health and Physical Education and Recreation, in Syracuse, as a "pinch-hitter" for our Director, Brigadier General Lewis B. Hershey. The subject is one of great interest, namely "National Rehabilitation." At that time, I propose to discuss with them our meeting here today. I shall call their attention to this suggestion for the creation of war-time intramural councils on student health, asking them to join with you in this effort. On the other hand, I hope that you, on your part, can lend support to their program. They likewise have an important piece of work to do. It is their job to attempt to shift the center of gravity of our educational system so that it will include Physical Preparedness. This is not a small undertaking. However, it is more evident now, than it ever has been in the past, that our national system of education is lacking in its attitude towards physical welfare and that it must strive for physical, as well as for mental, fitness. Education must interest itself in HQ's (health quotients) as well as in IQ's. Between their organization and yours, I hope that you can bring the proper educational authorities to share in this point of view.

In conclusion, may I reiterate that meeting with you here today has meant a real opportunity to me. I hope, most sincerely, that your organization will take seriously the proposal offered and make every effort to serve the purposes of National Defense in a broader way and along the lines herein suggested. War-time councils and the Student Health Services can aid materially in the improvement of the health of our students and, at the same time, exercise a leadership in the field which is essential to placing national health on a higher plane.

The Relation of the Middle Turbinate to Paranasal Sinusitis*

Frank L. Bryant, M.D.
Minneapolis, Minnesota

THE relation of the middle turbinate in both acute and chronic infections of the paranasal sinuses is of sufficient importance to justify analyzing its role. Not many years ago, partial amputation of the middle turbinate was often done to expedite drainage from an acutely infected frontal sinus. It was likewise common practice to exenterate some of the anterior ethmoid cells and perhaps rasp an opening into the frontal sinus. In chronic sinusitis complete removal of the middle turbinate was carried out in the belief that this would open the obstructed ostia of the various sinuses. Time and experience has taught many truths. Increasing knowledge of physiology and pathology have created a more respectful attitude for intranasal anatomy. Many patients upon whom early operative interference was carried out did not respond in a satisfactory manner and had either prolonged convalescence or frequent exacerbation of the acute condition. Removal of the middle turbinate on one with chronic sinusitis often left a nasal mucous membrane "carpeted with crusts and bathed in pus."

The middle turbinate lies at the cross-roads of the main nasal cavity and the communication of the several paranasal sinuses. Being so situated it occupies a crucial position. The basic structure of the middle turbinate exists as part of the lateral ethmoidal mass rather than as a separate osseous element. A thick mucous membrane, rich in venous channels that assume characteristics of erectile tissue, overlies the framework. Mucous glands are most numerous throughout. The middle turbinate, which is given a lobular appearance by the heavy mucosa, usually presents a shorter ventral vertical portion and a longer dorsal horizontal one. Occasionally the lobule of the middle turbinate assumes larger dimensions and mechanically obstructs the middle meatus at this point. It may also be responsible for crowding the nasal septum toward the opposite side.

Overhanging and lobule formations should not be mistaken for a later and very common distension of the middle turbinate due to an ingrowth of the infundibulum or anterior ethmoidal cell. By firmly touching the middle turbinate with a cotton wrapped applicator one may determine which condition exists. In juxtaposition to the middle turbinate are the various ethmoidal cell groups. The agger nasi, frontal ethmoid, infundibular, bullar and suprabullar cells all communicate with the middle meatus. In a certain number of middle turbinates are turbinal extensions. The posterior group of cells consists not only of those directly related to the superior meatus but here also there may be extensions into the turbinate itself.

A swollen and inflamed middle turbinate may act as a trap or lock when an acute infection exists in the frontal sinus. Anatomic arrangement in which the middle turbinate operculates over the middle meatus opening would present a complex problem. The pathological process is probably no more advanced in the sinus than that observed of the turbinate. Since the sinus is much less accessible to treatment than the turbinate, effort should be made to treat the turbinate so that the inflammation can resolve as quickly as possible. By doing this any accumulated exudate will have opportunity to drain through the natural opening. A middle turbinate with a large anterior cellular extension would likewise offer a task, especially if the ethmoids were coincidently involved, which would not be unlikely. A large septal deflection would complicate the picture. If the middle turbinate is swollen to such an extent that no middle meatus exists, effort to treat the empyema of the antrum without attention to the ethmoid and middle turbinate inflammation is not logical management. When the rhinologist finds either of these clinical pictures, evaluation of the problem must be made. If a cooling-off period is given and no surgical interference, no matter how slight, is carried out, the results in the majority of patients will be gratifying. The initial use of depletives and hot moist packs and steam inhalations followed later by vasoconstrictors rather than the initial, sole and copious use of vasoconstrictors have given more lasting relaxation of this area. When the peak of the acute infection has been passed and some semblance of a middle meatus appears, one can then irrigate or aspirate the involved sinus with more ease and less trauma to the adjacent parts.

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*Read before the South Dakota State Medical Association, May 18-20, 1941.

When the condition of a patient with acute frontal sinusitis becomes urgent in spite of general supportive, chemo-therapeutic methods, and local nasal treatment, a trephine opening made into the frontal sinus is of much less risk than intranasal amputation of the middle turbinate or rasping and opening into the frontal sinus. With the tension within the sinus removed, the ethmoid and turbinal inflammation will usually subside. Residual scarring and crusting will be minimal because no surgical intervention was done. In those patients with an acute empyema of the maxillary sinuses, an opening made into the inferior meatus to aspirate or irrigate should always be preceded by previous use of depletives and vasoconstrictors to the region of the middle turbinate and middle meatus. This will permit either air or exudate to pass through a less impeded ostium.

In those individuals who weather the acute process but whose sinus for some reason does not clear completely, a simple infraction of the middle turbinate toward the septum often aids in promoting the flow of this residual drainage. One may at this stage, judiciously remove any obstructing infundibular or agger nasi cells. Certainly this should not have to be a frequent procedure.

In those patients with an early chronic sinusitis which is limited to the fronto-ethmoid, maxillary-ethmoid or ethmo-spenoid groups of cells, infraction has been of definite value because, by increasing the size of the middle meatus, better ventilation and drainage is not only accomplished but maintained.

The rhinologists of today are removing fewer middle turbinates than a decade or two ago. If a turbinate is diseased to such a degree that its entire removal is indicated, this is prima facie evidence that involvement also definitely exists in the entire ethmoidal labyrinth. Careful clinical examination corroborated by Roentgen rays will help decide this. The one exception which may be listed is single cystic enlargement of the middle turbinate. An extension of the ethmoid cell turbinal may become so large as to produce a large obstructing middle turbinate. If this condition exists, a submucous removal of the cystic area can be accomplished without sacrificing the entire structure.

When chronic infection exists in the ethmoid sinus which has fronto-ethmoid or maxillary-ethmoid extensions, it is inconceivable to expect the removal of the middle turbinate to accomplish a cure. It is likewise impossible to do a thorough and complete exenteration by the intranasal route when such surgical anatomy exists. If disease is present throughout, tedious and frequent after-care which offers a questionable end result is required. The operative area will be constantly reinfected by invasion from the adjacent sinuses. Local treatment has not been of signal success.

What operative procedure has a rhinologist to offer a patient which combines safety and completeness? The external method of approach through the lamina papyracea fulfills both requirements. It is safe because the surgeon is operating with his instrument under direct guidance of his eye. The field is essentially free of blood by ligation of the ethmoidal arteries. The biting forcep is working in the same plane as the cribriform plate rather than against it as in the intranasal method. The curet is not employed. It is complete because the diseased middle turbinate can be completely removed without tearing or pulling. With this exposure, cellular extensions can be thoroughly removed. There is no undue risk in the removal of the turbinate and exposure of the dura, if this procedure is undertaken when the infection is in the chronic stage.

How does the removal of the middle turbinate affect the anatomy and physiology of the nose, is a question commonly asked. The nasal cavity is partly narrowed in its upper one-third by the prolapse of the orbital tissues through the cut lamina papyracea. If the infection has been completely eliminated, no drying or crusting will occur. The inferior turbinate hypertrophies to compensate for the increased nasal space. The patient will obviously not have a nasal cavity interior equal to a normal one but it will be far superior to the diseased one and a decided improvement over one operated by the intranasal route.

SUMMARY AND CONCLUSIONS

The role of the middle turbinate is discussed in its relation to acute and chronic infections of the paranasal sinuses. The rhinologist should conservatively treat acute infections of the sinuses rather than use operative interference in the region of the turbinate to promote drainage. In earlier chronic stages minor operative procedures may be employed. When the turbinate has become diseased in its entirety, complete removal by the external route is the safest method.

A New Wet Dressing

Judson C. Fisher, M.D.
New York City

A NEW and extremely effective wet dressing solution was brought to our attention a little over a year ago. This solution possesses a marked advantage in that it can be prepared from two tablets quickly as required. Two of these tablets in a pint of water liberates aluminum subacetate in an accurately measured concentration. In action this solution resembles Burow's solution, insofar as it exhibits astringent properties. Clinical trial demonstrated the solution to be definitely superior as an antiseptic, astringent and antiphlogistic. Since this solution is not made with lead-acetate, it is stable and lead-free which we consider a most important factor. This is of particular interest, since it has been shown by Combes[1] that a great disadvantage of the standard Burow's solution is the presence of lead acetate which might well be a causative factor for irritation. Hammet[2] has also shown that the free lead might also exercise an inhibiting action on the normal repair of tissue. The stability of this new wet dressing which is unaffected by light and temperature is another advantage. Up to the present time we have used the solution on over 200 cases with no untoward reactions noted in our patients. Our findings further bear out the work of Levin and Behman[3] on a group of 50 dermatological cases with this new solution. We found, as they did, that the solution acted more rapidly and with greater effectiveness than Burow's, Boric Acid, or Aqueous Magnesium Sulphate, fostering more rapid healing, reducing the time of convalescence, and aborting tendencies toward infection. Of considerable significance is the fact that in all cases we were afforded greater control during the progress of the treatment. Patients were able to prepare the solution at home with ease.

In the majority of cases, the new solution was the only medication used. We found that the immediate application of the solution to the open wound prevented infection, so that in a short time the wound became aseptic and amenable to healing ointments when necessary. Where we felt thorough cleaning of the wound was advisable, we used hot fomentations of the new solution. These hot solutions further aided in restoring circulation when needed. In control of subcutaneous hemorrhage, a cold wet dressing of the solution was employed.

The following abstracts of case reports illustrate the results obtained with this new wet dressing solution:

Case 1. A male, aged 51, a poultry dealer, while dressing a fowl cut into the back of the chicken with a cleaver. A spicule of bone scratched the palm of his left hand. The patient washed his hand and applied some iodine to the scratch. During the night he was awakened by a violent throbbing in the palm of his hand. It had become extremely swollen and inflamed. Upon examination, we noted an infection of the palm with edema involving all of the fingers and the volar and dorsal surfaces of the hand. A lymphangitis extended to the junction of the distal and middle one-third of the forearm. The wound was incised, drained and an injection of tetanus anti-toxin administered. A dressing covering the entire hand from the finger tips to the elbow bend was applied and saturated with the new wet dressing solution. The patient was given several sets of tablets for home use with instructions. The importance of keeping the dressing constantly saturated, was stressed. The patient appeared at our office daily for ten days, after which he was seen three times a week for two weeks. At the end of the fourth week he was discharged without loss of function of the hand. No other medication was used until the wound was aseptic. Then a healing ointment was applied.

Case 2. A male, aged 60, known to have diabetes of five years duration, developed a folliculitis over the dorsal surface of the proximal phalanx of the right little finger. He squeezed it, and within a few hours extensive cellulitis of the hand developed. He used home remedies, and followed the suggestions of friends for two days, by which time, the entire dorsal and volar surfaces of the hand had become markedly inflamed and swollen, and lymphangitis had begun. He consulted a physician who told him that in view of his diabetic condition, he should be admitted to a hospital and have incision and drainage performed there. He was referred to us. Incision and drainage were performed and a wet dressing of the new solution was applied. The dressing was used continually. No change was made in his diabetic treatment. Drainage was profuse for the first ten days, after which it subsided rapidly. In three weeks, the patient was discharged with perfect functional result.

Case 3. A male, aged 40, a superintendent of a building, received a contusion on the shin from a falling ash can. The skin not being broken, he disregarded it. The following day throbbing and redness with heat resulted. The integument of the middle one-third of the shin was tense, red and glossy. A diagnosis of cellulitis was made. Wet dressings of the new solution were applied and the patient instructed to keep off his feet. The patient returned to work in eight days.

Case 4. A male, aged 47, a tabulating machine repair man, caught his left hand between the lower pin box and the main bar. Over 30 pins penetrated the little, ring and middle fingers over the middle phalanges. Machine oil and carbon were carried into the punctures which extended from upper to palmar surfaces. The middle phalanges of the ring and little fingers were fractured. A well-padded splint to retain moisture and lend support to the fractures was applied. The solution was applied to the dressing for ten days with the splint in position. The wet dressing solution demonstrated an anesthetic effect, and healing continued rapidly.

Case 5. A male, 52, a chef, had heated a five gallon copper kettle of water and in the process of removing it suffered a first and second degree burn of the volar surface of the left forearm, left side of chest and abdomen and left thigh. Blebs were opened and waxed gauze mesh applied to the burned areas. Applications of the new wet dressing solution were administered continuously to the wounds for the four days patient was in bed. Healing was rapid. Desquamation began on the seventh day. The chest and abdomen healed in eight days. The patient returned to work on the ninth day. An ointment was continued on the arm and thigh for three days longer. Complete healing was effected in fourteen days with no scars. A slight residual erythema disappeared in two weeks.

Case 6. A female, aged 26, a clerk, slipped on a newly polished linoleum floor and hit the dorsum of the right foot against a filing cabinet. There resulted extensive hematoma, markedly elevated and discolored. The hematoma extended from the ankle mortise through the distal ends of the metatarsals. All foot motion was restricted. X-ray diagnosis was negative. Cold wet dressing of the new solution was applied for three days with the foot in elevation. Then hot wet dressing of the same was substituted for the next three days. Within one week the patient returned to work. Physiotherapy was used three times a week for two weeks and the patient discharged with no functional defeat.

SUMMARY AND CONCLUSIONS

A new wet dressing solution was made from two tablets, the formula of which consists of the sulphates, acetates and subacetates of aluminum and calcium plus acetic acid. The solution was prepared by dissolving the two tablets in a pint of water; the formation of a precipitate indicated that the planned chemical action was complete. The solution consisted principally of aluminum subacetate plus calcium sulphate, the precipitate. The solution was mixed before using. Cold solutions were used for swellings, sprains, burns and when injuries were fresh with the blood vessels ruptured subcutaneously. Hot solutions were used to liquefy secretions, production of erythema, and to increase motility of the injured member. The new wet dressing was used on over 200 cases. Tendencies toward infection were aborted and no untowards reactions were noted. Convalescence was shortened to an unusual degree. Except for the use of ointment in final stages, no medication other than the wet dressing was employed. Outpatient therapy was improved due to the ease with which the patient could follow the prescribed regimen.

The new tablet solution demonstrated superior effectiveness to previously employed wet dressings such as Burow's Solution, Boric Acid and Aqueous Magnesium Sulphate.

REFERENCES

1. Combes, F. C.: The Role of Burow's Solution in Dermatology, New York State J. Med. 40:37, (Jan.) 1940.

2. Hammet, F. S.: Protoplasma (July 20) 1929.

3. Levin, O. L., and Behman, H. T.: A new Effective Wet Dressing, Indust. Med. 10:81, (Feb.) 1941.

Note: The product used in this study was Domeboro Tabs, furnished by Dome Chemicals, New York, N. Y.

Book Reviews

Neuroanatomy, by FRED A. METTLER; St. Louis: C. V. Mosby Co.; 476 pages, 337 illustrations including 30 in color.

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This book presents an excellent description of both the gross and the microscopic anatomy of the nervous system. The illustrations are very complete, and the use of associated labeled drawings as well as the frequent inclusion of the surrounding cranial structures certainly enhances their practical value. Aside from the very adequate coverage of the neuroanatomy, the author has stimulated interest by indicating, whenever possible, clinical applications of the various anatomic relationships. Interest has also been maintained by brief references to various associated physiologic processes such as the factors underlying the convolutional pattern, formation and absorption of spinal fluid, physiologic considerations regarding the spinal cord, etc. This book is well written and complete.

Orientation in School Health, CLAIR V. LANGTON, Dr.P.H., Ed.D.; New York: Harper & Brothers; 680 pages. $3.00.

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Orientation in School Health is a worth-while contribution in the right direction. In his 700 pages of simple, understandable and authentic material, the author has provided a well-rounded discussion of the organization and administration of the school health program. Although his message is written chiefly for non-medical school personnel, school public health and private physicians can derive much useful information by reading it.

Medical services for school children have remained static for many years. Progress has been made in school sanitation, in hygiene of instruction and in physical education, but the health of the individual school child has been flagrantly neglected, ignored and evaded. Although physical defectiveness is known and admitted, and recent surveys have exposed the waste and inefficiency of medical inspection, school personnel day after day repeat the same mistakes and make no real attempts to decrease the alarming physical inferiority among our school children.

There are two criticisms to be made of the book: (1) Too much space is devoted to such fundamental sciences as bacteriology and physiology, and too little space to the health status of the child, and (2) the author straddles the fence in regard to practical programs necessary to improve the health of the child.

Shock Treatment in Psychiatry: A Manual, by LUCIE JESSNESS, M.D., Ph.D., and V. GERARD RYAN, M.D.; New York: Grune & Stratton, 1941; 149 pages. $3.50.

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A comprehensive survey of the three most popular shock methods used in psychiatry is now available. In three separate sections of this book, each of these methods with its most recent modifications is discussed clearly. Brief historical sketches, the latest theories and impartial evaluations of these different methods are carefully compiled. Nothing of importance regarding any of the procedures has been omitted. The directions are given in sufficient detail to be easily followed.

The authors of this excellent manual deserve considerable credit for their conservative attitude and frank discussions. No sweeping claims, nor unfounded optimistic statements are found here. They present a good review of the enormous literature with an impartial evaluation of the results to be expected.

The psychiatrist who has been unable to keep abreast of the extensive literature on this subject will find *Shock Treatment in Psychiatry* well worth while. The general practitioner, who is frequently asked by relatives of the patient for an opinion on the merits and dangers of shock treatment, will also find this manual invaluable.

School Health Services, *A Study of the Programs Developed by the Health Department in Six Tennessee Counties*, by W. FRANK WALKER, Dr.P.H. and CAROLINA R. RANDOLPH; New York: The Commonwealth Fund, 1941; 172 pages. $1.50.

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This excellent monograph is a contribution of outstanding importance in the field of Preventive Pediatrics. It is a joint six year survey by the Tennessee Department of Public Health and the Commonwealth Fund of the school health services among some 50,000 children.

The study endeavored to determine whether school health services have been effective and what might be done to make them more effective. Some of the most practical findings and conclusions are:

(1) Repeated examinations in and of themselves have no material influence upon the incidence of defects corrected.

(2) If the parent is present at examination, the incidence of correction is significantly higher than if the parent is absent.

(3) The health department has a responsibility for bringing about the immunization of a larger percentage of the school children against diphtheria, smallpox, and typhoid fever in typhoid infected areas.

(4) A service that is limited to routine examinations with no attempt at follow-up is both shortsighted and wasteful.

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84 South Tenth Street, Minneapolis, Minn.

W. L. Klein, 1851-1931

MINNEAPOLIS, MINN., MARCH, 1942

VITAMIN-MANIA

A Benign Affliction Assuming Epidemic Proportions

Dietary fads are only possible where there is a superabundance of food. This provides an explanation for the unchallenged supremacy of the United States as the home of popular food fads—and for the absence of such movements in China or India. However, belief in the special virtue of particular foods or food combinations is universal and not limited to any one time or place. Modern nutrition knowledge might appear to offer a scientific justification for this general belief but examination of the claims for food fads and fancies fails to reveal any anticipation of the facts of nutrition as revealed by methodical science.

The present vitamin craze exemplifies a common feature of almost all food fads—some basis of fact. In contrast with many food fads ,however, vitamin-mania is not apt to cause worse harm than unnecessary expense to its devotees, and may be turned to real advantage. So far it is probable that the great majority of vitamin purchasers are in no need of the extra vitamins while a far larger number of non-purchasers may be in need, in many cases serious need, of those same vitamins.

There are many heartening features in the current enthusiasm for vitamins, the foremost, perhaps, being that the real facts of nutrition, as known by our foremost authorities, are being made available to the general public by newspaper, magazine, radio and popular lectures. A little over-enthusiasm emanating from some of these authorities can be pardoned in view of the general benefit of the educational propaganda which they have stimulated. It is likewise heartening that an increasing proportion of the public is eager to learn those real facts and to make use of them. Finally, governmental and sociological agencies have been stirred to attempt to place the newer knowledge of nutrition at the service of the country as a whole and particularly of those regions where economic restriction or pernicious food habits have resulted in mass deficiencies.

The spectacular developments of the science of nutrition in recent years are justifiable cause for jubilation. It is essential, however, that we recognize some of the limitations of this new knowledge. We do not yet know, within an error of fifty per cent—or more!—the true minimal requirement of normal men and women for any one vitamin, nor do we know what may be the effects of mode of life, habits and activity on these requirements.

Accumulating experiences with different laboratory animals have abundantly proved the fallibility of the rat growth curve as a test of vitamin adequacy for anything but the growth of rats. Recent studies in the writer's laboratory have demonstrated a marked difference in the thiamin requirement for the growth of rats and for the maintenance of human adults.

There is a widespread belief that the benefits of vitamins extend far beyond the prevention of frank deficiency diseases. Certainly sub-clinical deficiency states do occur, and an intake of thiamin or nicotinic acid above the level to prevent actual beri-beri or pellagra is beneficial. This does not mean, however, that human well-being is related to the amount of vitamin intake beyond certain limits.

Studies in the writer's laboratory have pretty well disposed of the notion that vitamin "supercharging" can produce super-normal vigor. At least it has proved impossible to find any advantage of any kind in providing, over some weeks or months, unusually large daily intakes of thiamin, nicotinic acid, riboflavin, pantothenic acid, pyridoxine or ascorbic acid. These studies, made on U. S. Army personnel and hired subjects, were designed in particular to test possible effects on muscular power, endurance and recovery from fatigue. Among other things the results gave comforting assurance as to the complete vitamin adequacy of present U. S. Army garrison rations.

At present vitamin knowledge deserves more practical application. However, much more complete knowledge must be sought from rigidly controlled experimentation on human beings. Only by such means can we obtain the needed information as to the details of desirable human application.

In the meantime there seems to be little excuse for therapeutic prescription of massive vitamin dosage for the tired business man or the nervous clubwoman. We may even temper our sympathy for Mr. Harry Hopkins should he again have the misfortune to lose his supply of vitamin pills as reportedly occurred during his recent visit to Russia. And we may rejoice in the singular providence that even heroic doses of the vitamins are almost completely non-toxic.

ANCEL KEYS,
Director of the Laboratory of Physiological Hygiene,
Special Consultant to the Secretary of War, on Foods.

FASCINATOR PROFILAXIS

This is a plea for a return to the old-fashioned custom of wearing veils or fascinators over the face in cold and inclement weather. We are not concerned about milady's complexion or cosmetic bills resulting from exposure of a pretty face to the cruel elements of nature but rather with the many agents that enter the system through the upper respiratory tract. Although people no longer sally forth in open vehicles as of yore but ride in heated closed cars, there still seems to be a necessity, thank God, for some of them to get out and brave the elements occasionally.

The mucous membranes of the nose and throat are normally moist and warming. Civilized man has contrived to spend a good share of his time in artificially heated rooms that dry these membranes and materially reduce their protectant efficiency against disease invasion. Pathogenic microörganisms have ridden on airships long before their recognition by man. Dust particles carry them about and the air we inhale is an ever present source of infection because of this means of transportation, particularly when the mucous membranes are dry. Modern streamlined youth may not take kindly to the suggestion but old sinus afflicted rheumatics would doubtless appreciate the comfort that they could experience from the use of fascinator face masks on appropriate occasions.

A. E. H.

Woman's Auxiliary to the South Dakota State Medical Association

Rosebud District No. 10 Medical Auxiliary was organized January 23, 1942. Six Doctors' wives together with state president-elect Mrs. B. M. Hart, Onida, met at the home of Mrs. R. V. Overton, Winner, and elected the following officers: President, Mrs. R. J. Irwin, Burke; vice-president, Mrs. J. E. Studerberg, Gregory; secretary-treasurer, Mrs. R. V. Overton, Winner.

Other meetings of Auxiliaries were held recently at the following places: Winner, January 23; Mitchell, January 29; Sanator, February 5; Watertown, February 6; Sioux Falls, February 10; Huron, February 11.

As a tribute to the Doctors of South Dakota, March 30th has been designated as "Doctors' Day." This is the date of the 100th anniversary of the use of ether as an anesthetic. The various medical auxiliaries will entertain the Doctors of their vicinities.

The state meeting of the Woman's Auxiliary to the South Dakota State Medical association will be held in Sioux Falls, May 14-15. The annual meeting of the Woman's Auxiliary to the American Medical association will be held in Atlantic City, New Jersey, June 8-12.

Proceedings of the
Twenty-second Annual Meeting
of the
AMERICAN STUDENT HEALTH ASSOCIATION
Hotel New Yorker, New York City
December 30-31, 1941

OFFICERS—1942

President—Dr. J. P. Ritenour
Vice-President—Dr. J. G. Grant
Secretary-Treasurer—Dr. Ralph I. Canuteson

Council

Dr. John Sundwall	Dr. E. Lee Shrader
Dr. J. E. Raycroft	Dr. Charles E. Shepard
Dr. Thomas A. Storey	Dr. Ruth E. Boynton
Dr. Harold S. Diehl	Dr. George T. Blydenburgh
Dr. J. F. Edwards	Dr. Grace Hiller
Dr. Warren E. Forsythe	Dr. H. D. Lees
Dr. Dean F. Smiley	Dr. Irvin W. Sander
Dr. R. W. Bradshaw	Dr. C. E. Lyght

Dr. Helen Langner

Executive Committee

Dr. J. P. Ritenour	Dr. Ralph I. Canuteson
Dr. J. G. Grant	Dr. Warren E. Forsythe

Dr. Ruth E. Boynton

TUESDAY, DECEMBER 30, 1941

Morning Session

9:30–10:00 Registration—North Ball Room Foyer.
10:00–11:00 General Session—North Ball Room.
Call to order by the President.
President's Address—Dr. Ruth E. Boynton, University of Minnesota.
Vision Facts for Vision Reasons—Dr. Hedwig S. Kuhn, member of the Industrial Advisory Committee of the National Society for the Prevention of Blindness, Hammond, Indiana.
Physiotherapy—Dr. Richard Kovacs, Clinical Professor and Director of Physiotherapy, New York Polyclinic Medical School and Hospital, New York City.
Determining Health Needs of Students—Louis M. Heil, Research Associate in Science, Coöperative Study in General Education, University of Chicago.
12:30 Association Luncheon—Grand Ball Room.
The College Health Program and National Defense—Dr. L. G. Rowntree, Medical Director, Selective Service, Washington, D. C.

Afternoon Session

2:00–3:00 General Session—North Ball Room.
Business Meeting.
Report of the Secretary-Treasurer—Dr. Ralph I. Canuteson, University of Kansas.
Reports of the Chairmen of Committees:
Health Service—Dr. G. T. Blydenburgh, Ohio Wesleyan University.
Organization and Administration — Dr. William B. Brown, Stephens College.
Informational Hygiene—Dr. Charles E. Shepard, Stanford University.
Hygiene of Physical Activities—Dr. W. H. York, Princeton University.
Health Problems of College Women—Dr. Dorothea H. Scoville, Connecticut College for Women.
Editorial—Dr. E. Lee Shrader, St. Louis University.
Tuberculosis—Dr. Charles E. Lyght, Carleton College.
Local Sections—Dr. D. F. Smiley, Cornell University.
Eye Health—Dr. R. W. Bradshaw, Oberlin College.
Ear Health—Dr. J. Wilbur Armstrong, Berea College.
Mental Hygiene—Dr. Theophile Raphael, University of Michigan.
Training Personnel—Dr. W. E. Forsythe, University of Michigan.
Revision of Constitution—Dr. E. Lee Shrader, St. Louis University.
Appointment of Nominating Committee.
3:00–4:15 Round Table Sessions.
Committee on Health Service. Chairman: Dr. George T. Blydenburgh, Ohio Wesleyan University.
Section I—North Ball Room—Physiotherapy in a College Health Service. Discussion Leaders: Dr. Ruth M. Collings, Woman's College of the University of North Carolina, Dr. Richard Kovacs, New York City.
Section II—Parlor C—Wider Use of Health Service Statistics. Discussion Leaders: Dr. Llewellyn R. Cole, University of Wisconsin, Dr. Irvin W. Sander, Wayne University.
Section III—Parlor A—What Can Be Done About the Hazards of Touch Foot Ball? Discussion Leader: Dr. S. J. Miller, Purdue University.
Committee on Hygiene of Physical Activities—Panel Room. Chairman: Dr. W. H. York, Princeton University.
The Problems of the Physically Low Grade Student. Presiding: Dr. J. E. Sawhill, New York University.
4:30–6:00 Visit to National Health Library—Tea.
6:30 Council Dinner—Parlor C.

WEDNESDAY, DECEMBER 31, 1941

Morning Session

9:00–9:30 Business Session—North Ball Room.
Report of Nominating Committee.
Report of Council Meeting.
Making an Inventory of College Personnel Resources in Health Education—Louise Strachan, Director of Child Health Education, National Tuberculosis Association, New York City.
9:30–11:00 Round Table Sessions.
Committee on Organization and Administration—North Ball Room. Chairman: Dr. William B. Brown, Stephens College.
What are Health Services Contributing Toward National Defense? Discussed by Dr. Ruth E. Boynton, University of Minnesota, Dr. Charles E. Shepard, Stanford University, Dr. J. W. Wilce, Ohio State University, Dr. Lee W. Milford, Clemson Agricultural College, Dr. J. G. Grant, Iowa State College, Dr. W. H. York, Princeton University.
11:00–12:30 Committee on Informational Hygiene — Panel Room. Chairman: Dr. Charles E. Shepard, Stanford University.
Testing as a Means of Evaluating Health Information of College Students. Presiding: Dr. A. G. Gould, Cornell University. Discussed by: Dr. C. E. Turner, Massachusetts Institute of Technology. Dr. K. Frances Scott, Smith College, Dr. Jane North Baldwin, Vassar College, Dr. John J. Boehrer, University of Minnesota.
Committee on Health Problems of College Women—Parlor A. Chairman: Dr. Dorothea H. Scoville, Connecticut College for Women.
Effect of Minor Defects upon Social Adjustment.
12:30 Tuberculosis Committee Luncheon—Grand Ball Room.
Tuberculosis Case Finding in Colleges—Dr. Robert E. Plunkett, Division of Tuberculosis, New York State Department of Health, Albany, New York.
12:30 Council Luncheon—North Ball Room.

Afternoon Session

2:30 General Session—North Ball Room.

Student Conservation of Hearing—Dr. Edmund P. Fowler, Jr., Director of the Conservation of Hearing Clinics, Manhattan Eye and Ear Hospital and the Columbia Presbyterian Medical Center, New York City.

Incoördination and States of Tension—Dr. Smiley Blanton, Consultant Psychiatrist, Marble Collegiate Church, New York City.

Nutrition Problems Among College Students—Dr. John J. Boehrer, Students' Health Service, University of Minnesota.

Mental Hygiene—Dr. Helen Langner, Vassar College.

BUSINESS MEETING

December 30, 1941

The meeting was called to order by the President, Dr. Ruth E. Boynton, at 2:30 P. M. Approximately 100 members were present.

The Secretary-Treasurer read the following report of the last Council meeting held December 28, 1940:

The following members were present: Dr. Ruth E. Boynton, Dr. Warren E. Forsythe, Dr. R. W. Bradshaw, Dr. Charles E. Shepard, Dr. W. H. York, Dr. H. N. Kingsford, Dr. J. P. Ritenour, Dr. Joseph E. Raycroft, Dr. John H. Sundwall, Dr. Dean F. Smiley, Dr. Ralph I. Canuteson, and new Council members: Dr. Grace Hiller and Dr. George T. Blydenburgh.

Continuing the business of the previous Council Meeting, the Secretary brought up the question of preparing a booklet of information about the Association, including its Constitution, By-Laws, purposes, qualifications for membership, section groups, etc., for the purpose of answering questions received by the Secretary.

Dr. Smiley moved, Dr. Ritenour seconded the motion that the Secretary be authorized to have such a booklet printed for distribution to members of the Association as well as to those who write in for information. Motion passed.

Discussion of the place of the next annual meeting elicited a preference by some members of the Council for changing the place of meeting occasionally in order to draw from sections of the country not heavily represented at the New York meetings.

Dr. York moved and Dr. Shepard seconded that the next meeting be held in New York City. Motion carried.

Date of the meeting was left to the decision of the Executive Committee, with a suggestion that consideration be given to the dates of the meetings of the National Collegiate Athletic Association so that members interested in both organizations could attend both meetings.

Dr. Boynton opened discussion of a proposal made by the Secretary to send out to the members a brief newsletter at appropriate intervals, to meet a need for getting information of interest to the members to them on short notice. This would not in any way duplicate or substitute for notices or news items in the Journal-Lancet.

Dr. Smiley moved and Dr. Raycroft seconded a motion that the secretary be authorized to undertake the plan. Motion carried. Dr. Raycroft suggested that the first letter contain an account of the recent influenza epidemic which had reached Stanford University.

Dr. Shepard read the resolution prepared by Dr. Storey and suggested some changes which would condense the wording of the proposal. In the active discussion following it was brought out that the resolution was in agreement with the principles of the American Student Health Association, that the matter probably could best be handled by a committee, that this committee should act on all problems of the American Student Health Association in relation to National Defense, and that more positive results would follow if the committee would offer to act as a liaison between the American Student Health Association and the American Social Hygiene Association.

Dr. Smiley moved that the Executive Committee take over the duties of this committee. Seconded by Dr. Raycroft. Motion carried.

It was decided to form a new Ear Health Committee to carry on the work initiated by the Health Service Committee under Dr. Armstrong. The Council authorized payment of travel expenses (railroad fare and room) of Dr. Horace Newhart who had coöperated fully in the program of the Health Service Committee.

Two suggestions, not in the form of motions, were discussed: (a) Wider distribution and an increased supply to members of the preliminary programs. (b) Request approval of section officers on applications of new members in the Association. It was also suggested that new members should first take membership in the local sections before applying to the parent organization.

Meeting adjourned at 3:00 P. M.

The Secretary-Treasurer read the following financial report for the year.

Receipts

Balance brought forward		$1,318.35		
Savings account	$1,083.08			
Interest	8.14	1,091.22		$2,409.57
Dues for 1941 from 181 member institutions (includes 3 prospective members; $8.00 from Duluth, less $2.00 subscription for J-L; and $7.50 from Duke, less section refund)		1,805.50		
Dues for 1940 from 11 member institutions (includes $8.00 from Duluth re J-L)		108.00		
Dues for 1942 from 1 member institution and 3 prospective members		40.00	$1,963.50	
Proceedings, 36 sold (one for $1.50) at $1.75		62.75		
Refund from Dr. Paine for Washington and Lee		2.50		
Meal ticket refund, Dr. Forsythe		3.00	68.25	2,031.75
			Total	$4,441.32

Disbursements

Secretary's Office:		
Postage	$ 65.67	
Telegrams	1.75	
Stationery	51.72	
Newsletters and preliminary programs	37.60	
Exchange on checks	.68	
Secretarial help	50.00	$207.42
Subscriptions to Journal-Lancet, (189)		283.50
Publish Proceedings, 1940:		
450 copies	445.00	
500 labels	4.50	
450 boxes	49.50	
Postage	13.65	512.65
Membership in American Council of Education		10.00
Refunds to Sections:		
Pacific Coast (8) (1—1940)	20.00	
Rocky Mountain (7)	17.50	
Southwestern (7)	17.50	
South Central (12)	30.00	
North Central (17)	42.50	
Michigan (8) (2—1940)	20.00	
Indiana (6)	15.00	
Ohio (16) (1—1940)	40.00	
Mid Atlantic (15)	37.50	
Southern (10) (1—1940)	25.00	
(Duke refund retained by section)		
New York (17)	42.50	
Pennsylvania and New Jersey (22) (2—1940 and $1.00)	56.00	

Mississippi Valley (6)	15.00		
New England (25)	62.50		
Illinois—no refund			
Mid Atlantic, Washington & Lee	2.50		
North Central, Duluth S.T.C.	2.50	446.00	
Committee Expense: Dr. Lyght		5.50	
Travel Expenses: Dr. Boynton, Columbus and New Orleans		25.00	
Dr. Smiley		21.30	
Convention (1940) expense: University of Michigan for janitor		13.27	
Total Expenses		1,524.64	1,524.64
Balance			2,916.68

Both reports were approved.

The President appointed the members of the Nominating Committee. Because of the lateness of the hour the reports of Chairmen of Committees were postponed until the following day.

The meeting adjourned at 3:00 P. M. to reconvene in round-table sessions.

BUSINESS MEETING

December 31, 1941

The meeting was called to order at 9:00 A. M. by the President, Dr. Ruth E. Boynton. Forty-five members were present.

The Secretary-Treasurer, Dr. Ralph I. Canuteson, presented the following report of the two Council meetings held on December 30, 1941:

The following members of the Council met at 7:45 A. M. Tuesday, December 30, 1941, and discussed paragraph by paragraph the proposed changes in the Constitution:

Dr. Ruth E. Boynton, Dr. A. G. Gould, Dr. John Sundwall, Dr. Thomas E. Storey, Dr. Warren E. Forsythe, Dr. E. Lee Shrader, Dr. Charles E. Shepard, Dr. Florence Gilman, Dr. J. P. Ritenour, Dr. Ralph I. Canuteson.

Dr. Ralph I. Canuteson presented Dr. Boynton a gavel for the Association. The Council moved that the letter accompanying the gavel be read to the General Assembly and be printed in the Proceedings.

The meeting adjourned at 9:30 A. M.

The Council re-convened at 5:00 P. M. December 30, 1941, and completed the discussion of proposed changes in the Constitution. Dr. Ritenour moved and Dr. Gould seconded Council approval of the Constitution as revised including changes made as a result of the prolonged Council discussion. The following members were present and voted in favor of the motion:

Dr. Ruth E. Boynton, Dr. A. G. Gould, Dr. J. E. Raycroft, Dr. Warren E. Forsythe, Dr. E. Lee Shrader, Dr. Charles E. Shepard, Dr. W. H. York, Dr. Florence Gilman, Dr. J. P. Ritenour, Dr. Grace Hiller, Dr. H. D. Lees, Dr. Ralph I. Canuteson.

Applications from the following schools were presented, and all were approved for membership in the Association:

Duke University, Durham, North Carolina.
Florida State College for Women, Tallahassee, Florida.
Municipal University of Omaha, Omaha, Nebraska.
Oklahoma Agricultural and Mechanical College, Stillwater, Oklahoma.

The Council meeting adjourned at 12:00 o'clock midnight.

* * * * * * *

Dr. E. Lee Shrader presented the report of the Committee on Revision of the Constitution and discussed the important changes. Dr. J. W. Wilce moved, and Dr. Warren E. Forsythe seconded, that the report of the Committee on Revision of the Constitution as approved by the Council be accepted. The motion passed with no dissenting votes.

Reports of Chairmen of Committees, postponed from December 30, 1941, were presented in the following order:

Informational Hygiene, Dr. Charles E. Shepard.
Hygiene of Physical Activities, Dr. W. H. York.
Editorial, Dr. E. Lee Shrader.
Tuberculosis, Dr. C. E. Lyght.
Memorial to Dr. Reuben H. Stiehm.
Eye Health, Dr. Lee H. Ferguson for Dr. R. W. Bradshaw.
Ear Health, Dr. J. Wilbur Armstrong.
Mental Hygiene, Dr. Warren E. Forsythe for Dr. Theophile Raphael.
Training Personnel, Dr. Warren E. Forsythe.

Miss Louise Strachan, Director of Child Health Education for the National Tuberculosis Association explained a plan of the Health Instruction Section of the American Association for Health, Physical Education and Recreation to make a survey of trained personnel in health education in colleges.

The Nominating Committee composed of Dr. Charles E. Shepard, Chairman, Dr. Jane North Baldwin and Dr. E. Lee Shrader appointed by the President, Dr. Ruth E. Boynton on Tuesday, December 30, 1941, presented the following ballot for officers of the Association for 1942:

President: Dr. J. P. Ritenour, Pennsylvania State College, State College, Pennsylvania.
Vice-President: Dr. J. G. Grant, Iowa State College, Ames, Iowa.
Secretary-Treasurer: Dr. Ralph I. Canuteson, University of Kansas, Lawrence, Kansas.
Members of the Council, for two years, terms expiring December, 1943: Dr. Irvin W. Sander, Wayne University, Detroit, Michigan. Dr. C. E. Lyght, Carleton College, Northfield, Minnesota. Dr. Helen Langner, Vassar College, Poughkeepsie, New York.

Dr. John Wilce moved and Dr. Warren E. Forsythe seconded, that the report of the Nominating Committee be accepted and that the Secretary be instructed to cast an unanimous ballot for these officers. There was no discussion. The motion was carried unanimously.

The Secretary was requested to send a message to Drs. Blydenburgh and McCleery who were injured while on their way to the New York meeting.

The meeting adjourned at 10:00 A. M.

MEMBER INSTITUTIONS, ADDRESSES AND REPRESENTATIVES

Adelphi College, Garden City, New York—Dr. Faith S. Wohnus, Miss Janet Marchant.
Agnes Scott College, Decatur, Georgia—Dr. Eugenia C. Jones.
Alabama Polytechnic Institute, Auburn, Alabama, Dr. J. W. Dennis.
Allegheny College, Meadville, Pennsylvania—Mr. H. P. Way.
Amherst College, Amherst, Massachusetts—Dr. Edward Manwell.
Antioch College, Yellow Springs, Ohio—Dr. P. B. Wingfield.
Baldwin-Wallace College, Berea, Ohio—Mr. E. L. Finnigan, Dr. Robert H. Lechner.
Ball State Teachers College, Muncie, Indiana—Dr. Amelia T. Wood.
Bennett College, Greensboro, North Carolina—Director of Health Service.
Bennington College, Bennington, Vermont — Dr. Joseph Chassell.
Berea College, Berea, Kentucky—Dr. J. Wilbur Armstrong.
Boston University, Boston, Massachusetts—Dr. Nathan Garrick.
Bowdoin College, Brunswick, Maine—Dr. H. L. Johnson.
Brigham Young University, Provo, Utah—Mr. D. Elden Beck.
Brooklyn College, New York City—Dr. Sally E. Kutz, Dr. Juliette Bernat.
Brown University, Providence, Rhode Island—Dr. A. M. Burgess, Dr. Wilfred Pickles.
Bryn Mawr College, Bryn Mawr, Pennsylvania—Dr. Olga Leary.
Bucknell University, Lewisburg, Pennsylvania—Dr. Lester P. Fowle.
Buffalo, University of, Buffalo, New York—Dr. C. H. Keene.
California, University of, Berkeley, California—Dr. William G. Donald, Dr. Ruby Cunningham.
Carleton College, Northfield, Minnesota—Dr. C. E. Lyght, Dr. Caroline Helmick.
Carnegia Institute of Technology, Pittsburgh, Pennsylvania—Dr. George Sippel.
Central State Teachers College, Mount Pleasant, Michigan—Louis E. Hutto.

Chicago, University of, Chicago, Illinois—Dr. D. B. Reed, Dr. Ruth E. Taylor.
Cincinnati, University of, Cincinnati, Ohio—Dr. L. B. Chenoweth, Dr. Marion Abbott Boyd.
Clark University, Worcester, Massachusetts—Dr. M. B. Fox.
Clemson Agricultural College, Clemson College, South Carolina—Dr. Lee W. Milford.
Colby Junior College for Women, New London, New Hampshire—Dr. William P. Clough, Miss Viola G. Pfrommer.
Colgate University, Hamilton, New York—Dr. L. C. Beebe.
Colorado College, Colorado Springs, Colorado—Dr. Leo W. Bortree.
Colorado, University of, Boulder, Colorado—Dr. L. W. Holden, Dr. Harry G. Carlson.
Columbia University, College of Physicians and Surgeons, New York City—Dr. Alexander Gutman.
Columbia University, University Medical Officer's Department, New York City—Dr. W. W. McCastline.
Connecticut College for Women, New London, Connecticut—Dr. Dorothea H. Scoville.
Connecticut, University of, Storrs, Connecticut—Dr. R. L. Gilman.
Cornell University, Ithaca, New York—Dr. D. F. Smiley, Dr. A. G. Gould, Dr. Norman S. Moore, Dr. Muriel Cuykendall.
Dartmouth College, Hanover, New Hampshire—Dr. H. N. Kingsford.
Denison University, Granville, Ohio—Dr. R. H. Williams.
Denver, University of, Denver, Colorado—Dr. Broda O. Barnes, Dean R. J. Walters, Dean Clem W. Collins.
DePauw University, Greencastle, Indiana—Dr. George F. Parker.
Drexel Institute, Philadelphia, Pennsylvania—Dr. J. H. Arnett, Dr. William C. Cantey.
Duke University, Durham, North Carolina—Dr. J. A. Speed.
Fenn College, Cleveland, Ohio—Mr. J. C. Nichols, Dean; Dr. Hyman Lumer, Dr. Harry D. Morris.
Florida State College for Women, Tallahassee, Florida—Dr. Lucille J. Marsh.
Florida, University of, Gainesville, Florida—Dr. George C. Tillman.
Furman University, Greenville, South Carolina—Dr. Chas. N. Wyatt.
George School, George School, Bucks County, Pennsylvania—Dr. Dino E. P. McCurdy.
George Washington University, Washington, D. C.—Dr. D. L. Borden, Dr. Frank A. Hornaday.
Goucher College, Baltimore, Maryland—Dr. Grace Hiller, Dr. Grace Baker, Dr. Jessie L. King.
Hampden-Sydney College, Hampden-Sydney, Virginia — Dr. Ray A. Moore.
Harvard University, Cambridge, Massachusetts—Dr. A. V. Bock, Dr. Fabyan Packard.
Haverford College, Haverford, Pennsylvania — Dr. Herbert Taylor.
Hollins College, Hollins College, Virginia—Dr. Faith Gordon.
Hood College, Frederick, Maryland—Dr. A. Austin Pearre.
Howard University, Washington, D. C.—Dr. Paul B. Cornely, Dr. Dorothy B. Ferebee.
Hunter College, New York City—Dr. William J. Fordrung, Dr. Louise Brown.
Idaho, University of, Moscow, Idaho—Dr. Harold D. Cramer.
Illinois, Northern, State Teachers College, DeKalb, Illinois—Dr. L. C. Benesh.
Illinois, University of, Urbana, Illinois—Dr. J. Howard Beard.
Indiana, State Teachers College, Terre Haute, Indiana—Dr. Floyd Riggs.
Indiana University, Bloomington, Indiana — Dr. Edith B. Schuman.
Iowa State College, Ames, Iowa—Dr. J. G. Grant, Miss Fern A. Goulding.
Iowa State Teachers College, Cedar Falls, Iowa—Dr. M. L. Durfee, Dr. Margaret P. Thoroman.
Iowa, University of, Iowa City, Iowa—Dr. C. I. Miller.
Jefferson Medical College, Philadelphia, Pennsylvania—Dr. H. R. Hamrick.
Kansas State College of Agriculture and Applied Science, Manhattan, Kansas—Dr. M. W. Husband.
Kansas State Teachers College, Pittsburg, Kansas—Dr. J. Ralph Wells.
Kansas, University of, Lawrence, Kansas—Dr. Ralph I. Canuteson.
Kent State University, Kent, Ohio—Dr. A. O. DeWeese.
Kentucky, Eastern, State Teachers College, Richmond, Kentucky—Dr. J. D. Farris.
Kentucky, University of, Lexington, Kentucky—Dr. J. S. Chambers.
Keuka College, Keuka Park, New York—Dr. Barbara K. Strait, Miss Dorothy Felt.
Knox College, Galesburg, Illinois—Dr. Myron Weaver.
Lawrenceville School, Lawrenceville, New Jersey—Dr. A. B. Light.
Lehigh University, Bethlehem, Pennsylvania—Dr. R. C. Bull.
Long Island College of Medicine, 350 Henry Street, Brooklyn, New York—Dr. Ernest E. Keet, Jr.
Loyola University, 706 South Lincoln, Chicago, Illinois—Dr. Earl E. Kleinschmidt.
Maine, University of, Orono, Maine—Dr. Walter C. Hall, Mr. L. S. Corbett.
Mary Baldwin College, Staunton, Virginia—Dr. Florence Mahoney, Dr. Kenneth Bradford.
Mary Washington College, Fredericksburg, Virginia—Dr. Mildred Esther Scott.
Maryland, University of, Department of Health, College Park, Maryland—Dr. Leonard Hays.
Massachusetts Institute of Technology, Cambridge, Massachusetts—Dr. George W. Morse, Professor C. E. Turner.
Massachusetts State College, Amherst, Massachusetts—Dr. E. J. Radcliffe, Dr. Evelyn B. Ellms.
McGill University, Montreal, Quebec, Canada—Dr. A. S. Lamb.
Miami University, Oxford, Ohio—Dr. J. D. Schonwald, Dr. Earl Von Horn.
Michigan State College, East Lansing, Michigan—Director of Health Service.
Michigan State Normal College, Ypsilanti, Michigan—Dr. Glenadine Snow.
Michigan, University of, Ann Arbor, Michigan—Dr. W. E. Forsythe, Dr. Margaret Bell.
Michigan, Western, College of Education, Kalamazoo, Michigan—Miss Ellis J. Walker.
Mills College, Oakland, California—Miss Edith Lindsay.
Minnesota State Teachers College, Bemidji, Minnesota—Mr. Alfred M. Elliott, Miss Amy M. Erickson.
Minnesota State Teachers College, Duluth, Minnesota—Miss Catherin Vavra, R.N., Dr. A. O. Swenson, Dr. Selma Mueller.
Minnesota State Teachers College, Mankato, Minnesota—Mr. Wesley P. Cushman.
Minnesota State Teachers College, St. Cloud, Minnesota—Dr. M. Elizabeth Barker, Miss Mabel Johnson.
Minnesota State Teachers College, Winona, Minnesota—Mr. G. E. Galligan.
Minnesota, University of, Minneapolis, Minnesota—Dr. Ruth E. Boynton.
Mississippi State College for Women, Columbus, Mississippi—Dr. Marie Baldwin.
Missouri, North East, State Teachers College, Kirksville, Missouri—Dr. A. F. Miller.
Missouri School of Mines, Rolla, Missouri—Dr. E. E. Feind.
Missouri, University of, Columbia, Missouri—Dr. Dan G. Stine.
Montana, University of, Missoula, Montana—Dr. M. B. Hesdorffer.
Mount Holyoke College, South Hadley, Massachusetts—Dr. Pattie J. Grove, Dr. Ruth E. Fairbank.
Mount Union College, Alliance, Ohio—Dr. Perry F. King.
Muskingum College, New Concord, Ohio—Dr. J. M. McCleery.
Nebraska, University of, Lincoln, Nebraska — Dr. R. A. Lyman.

New Hampshire, University of, Durham, New Hampshire—Dr. B. D. Roberts.
New Jersey College for Women, New Brunswick, New Jersey—Dr. Ruth Stephenson.
New Jersey State Teachers College, Newark, New Jersey—Dr. Grace M. Kahrs.
New York, College of the City of, New York City—Dr. F. A. Woll, Dr. Oswald LaRotonda.
New York State College for Teachers, Albany, New York—Dr. Caroline Croasdale.
New York University, New York City—Harold O. Voorhis, Dr. John E. Sawhill, Mr. Edgar S. Tilton, Dr. Michael M. Tetelman.
North Carolina, Woman's College of University of, Greensboro, North Carolina—Dr. Ruth M. Collings, Dr. Berniece Eversmeyer.
North Carolina, University of, Chapel Hill, North Carolina—Dr. Reese Berryhill.
North Dakota State Teachers College, Valley City, North Dakota—Miss Mercedes Weiss.
Northwestern University, Evanston, Illinois—Dr. Samuel J. Lang, Dr. Mary Pope.
Oberlin College, Oberlin, Ohio—Dr. R. W. Bradshaw.
Ohio State University, Columbus, Ohio—Dr. J. W. Wilce.
Ohio University, Athens, Ohio—Dr. E. Herndon Hudson, Mr. O. C. Bird.
Ohio Wesleyan University, Delaware, Ohio—Dr. George T. Blydenburgh.
Oklahoma Agricultural and Mechanical College, Stillwater, Oklahoma—Dr. W. C. Thompson.
Oklahoma, University of, Norman, Oklahoma—Dr. W. A. Fowler.
Olivet College, Olivet, Michigan—Dr. Paul Engle, Miss Dorothy B. Prior.
Omaha Municipal University, Omaha, Nebraska—Dr. John C. Sharpe, Miss Alyce Arnold.
Oregon State (Agricultural) College, Corvallis, Oregon—Dr. D. C. Reynolds.
Oregon, University of, Eugene, Oregon—Dr. Fred N. Miller.
Panzer College, 139 Glenwood Avenue, East Orange, New Jersey—Dr. H. F. Kilander.
Pennsylvania, State College, State College, Pennsylvania—Dr. J. P. Ritenour.
Pennsylvania State Teachers College, West Chester, Pennsylvania—Dr. Henry Pleasants, Jr., Dr. Eleanor Aldworth.
Pennsylvania, University of, Philadelphia, Pennsylvania—Dr. H. D. Lees.
Pittsburgh, University of, Pittsburgh, Pennsylvania—Dr. H. C. Carlson, Dr. Auleen M. Jamison.
Princeton University, Princeton, New Jersey—Dr. W. H. York, Dr. Harry McPhee.
Providence College, Providence, Rhode Island—Dr. Frederic J. Burns.
Purdue University, Lafayette, Indiana—Dr. S. J. Miller.
Radcliffe College, Cambridge, Massachusetts—Dr. Harriet L. Hardy.
Randolph-Macon College, Ashland, Virginia—Dr. A. C. Ray, Jr.
Rhode Island State College, Kingston, Rhode Island—Dr. H. B. Potter.
Richmond, University of, Richmond, Virginia—Dr. Cullen Pitt, Dean R. B. Pinchbeck.
Rochester, University of, Rochester, New York—Dr. Edwin Fauver.
Rollins College, Winter Park, Florida—Dr. Fred Mathers, Dr. Meredith Mallory.
Russell Sage College, Troy, New York—Dr. Hilde Siering.
Rutgers University, New Brunswick, New Jersey—Dr. W. R. Greenwood, Dr. J. H. Kler.
Saint Louis University School of Medicine, St. Louis, Missouri, Dr. E. Lee Shrader.
Sam Houston State Teachers College, Huntsville, Texas—Dr. L. E. Bush.
Sarah Lawrence College, Bronxville, New York—Miss Edna L. Moorhouse.
Skidmore College, Saratoga Springs, New York—Dr. Claire King Amyot.
Smith College, Northampton, Massachusetts — Dr. Florence Gilman, Dr. K. Frances Scott.
South Dakota, State College of, Brookings, South Dakota—Dr. Henrik Tillisch.
Stanford University, California—Dr. O. N. Andersen, Dr. Charles E. Shepard, Dr. Helen B. Pryor.
Stephens College, Columbia, Missouri—Dr. William B. Brown, Dr. LaRue S. Highsmith, Dr. Joseph H. Delaney.
Stout Institute, Menomonie, Wisconsin—Dr. Julius Blom, Miss Marian Boardman.
Syracuse University, Syracuse, New York—Dr. L. M. Hickernell.
Temple University, Philadelphia, Pennsylvania—Mr. Frederick Prosch.
Tennessee, University of, Knoxville, Tennessee—Dr. G. T. Wilhelm.
Texas Dental College, Houston, Texas—Dr. F. C. Elliott.
Texas, North, State Teachers College, Denton, Texas—Dr. L. O. Hayes.
Texas State College for Women, Denton, Texas—Dr. Elizabeth A. Taylor.
Texas, University of, Austin, Texas—Dr. Joe Gilbert.
Trinity College, Hartford, Connecticut—Dr. H. C. Swan.
Tufts College, Medford, Massachusetts—Dr. John R. Marshall.
Utah, University of, Salt Lake City, Utah—Dr. H. L. Marshall.
Vanderbilt University, Nashville, Tennessee—Dr. T. B. Zerfoss, Dr. Kate Savage Zerfoss.
Vassar College, Poughkeepsie, New York—Dr. Jane North Baldwin, Dr. Helen P. Langner.
Virginia, Medical College of, Richmond, Virginia—Dr. Fred J. Wampler, Dr. James P. Baker, Jr.
Virginia Polytechnic Institute, Blacksburg, Virginia—Dr. C. R. Woolwine.
Virginia State Teachers College, Farmville, Virginia—Dr. Jean M. Martin.
Virginia, University of, University, Virginia—Dr. Andrew Hart, Jr., Dr. John O. McNeal, Miss Evelyn McMurdo.
Washington and Lee University, Lexington, Virginia—Dr. Reid White, Jr.
Washington, State College of, Pullman, Washington—Dr. D. W. McKinlay.
Washington, University of, Seattle, Washington—Dr. David C. Hall.
Washington University, St. Louis, Missouri—Dr. F. H. Ewerhardt, Dr. Paul O. Hageman, Dr. J. Ted Jean.
Wayne University, Detroit, Michigan—Dr. Irvin W. Sander.
Wellesley College, Wellesley, Massachusetts—Dr. Mary DeKruif.
Wesleyan University, Middletown, Connecticut—Dr. Edgar Fauver.
Western Reserve University, Cleveland, Ohio—Dr. Lee H. Ferguson.
West Virginia University, Morgantown, West Virginia—Dr. R. R. Summers.
Wichita, Municipal University of, Wichita, Kansas—Dr. Clinton McDonald.
Wilberforce University, Wilberforce, Ohio—Dr. Harry M. Lackey.
William Jewell College, Liberty, Missouri—Dr. Frank Edson.
William and Mary, College of, Williamsburg, Virginia—Professor L. Tucker Jones, Miss Grace J. Blank.
Williams College, Williamstown, Massachusetts—Dr. E. A. Locke.
Wilson College, Chambersburg, Pennsylvania—Dr. Agnes Lyon Brown.
Wisconsin State Teachers College, Milwaukee, Wisconsin—Dr. Benjamin Lieberman, Dr. Elsa Edelman.
Wisconsin State Teachers College, Platteville, Wisconsin—Dean V. E. Nylin.
Wisconsin State Teachers College, Superior, Wisconsin—Dr. R. E. Christianson, Miss Raidie Poole.
Wisconsin, University of, Madison, Wisconsin—Dr. Llewellyn R. Cole.

Woman's Medical College of Pennsylvania, Philadelphia, Pennsylvania—Dr. Martha Tracy, Dr. Sarah I. Morris.
Wooster, College of, Wooster, Ohio—Dr. R. N. Wright.
Wyoming, University of, Laramie, Wyoming—Dr. L. L. Sanford.
Yale University, New Haven, Connecticut—Dr. Orville Rogers, Dr. Joseph H. Hickson.
Yeshiva College, New York City—Dr. David A. Swick.

News Items

The North Dakota State Board of Medical Examiners, at its regular meeting January 9, 1942, purchased three One Thousand Dollar Defense Bonds, using for that purpose money that had accumulated in the Annual Registration Fund. The announcement is made by Dr. G. M. Williamson, secretary-treasurer of the Board, who adds: "Thus every physician registered in North Dakota becomes an active participant in helping to furnish money to win this war."

New chiefs of staff in Minneapolis hospitals are: Asbury, Dr. H. O. McPheeters; Deaconess, Dr. Malcolm Pfunder; Eitel, Dr. Gilbert J. Thomas; Northwestern, Dr. George Dunn; St. Andrews, Dr. Harry Johnson; St. Barnabas, Dr. R. M. Rosenwald; St. Mary's, Dr. J. T. Litchfield; and Swedish, Dr. C. M. Larson.

Dr. R. M. Kilgard, Watertown, South Dakota, was elected president of the Second District Medical society at the recent election. Dr. M. C. Rousseau was named vice-president and Dr. M. W. Larsen re-elected secretary and treasurer. Dr. B. M. Hart, president of the South Dakota State Medical association, addressed the group at the conclusion of the business meeting.

Dr. H. G. Rice, Moorhead, Minnesota, is the new president of the Clay-Becker Medical association.

Dr. E. A. Welden was elected president of the Fergus County Medical society (Montana) at the recent meeting of the group. Dr. C. W. Wilder was chosen vice-president; Dr. Fred Attix, secretary-treasurer; Dr. E. W. Gans, state association delegate; and Dr. C. C. Wallin, alternate delegate.

Dr. E. W. Zeman has been named health director of Hibbing, Minnesota.

Because of the war, the thirty-second annual Clinical Congress of the American College of Surgeons will be held in Chicago October 19-23, 1942, instead of in Los Angeles as originally planned. Headquarters will be at the Stevens Hotel. The twenty-fifth annual Hospital Standardization Conference sponsored by the College will be held simultaneously. The programs of both meetings will be based chiefly on wartime activities as they affect surgeons and hospital personnel in military and civilian service.

Dr. William A. O'Brien, director of postgraduate medical education at the University of Minnesota, was re-elected president of the Minnesota Society for the Control of Cancer at the annual meeting held in Minneapolis February 24.

St. Joseph's hospital of Dickinson, North Dakota, is the first in North Dakota to establish a blood and plasma bank for the immediate relief of persons requiring transfusions.

Dr. E. G. Hubin, Deerwood, Minnesota, was elected president of the Upper Mississippi Medical association at the annual meeting of the group help in Brainerd recently. Dr. Garlock, Bemidji, was named first vice-president; Dr. D. L. Johnson, Little Falls, second vice-president; Dr. Glen Leemhuis, McGregor, third vice-president; and Dr. G. I. Badeaux, Brainerd, secretary-treasurer.

Dr. John Martin, formerly of Roundup, Montana, has been commissioned as a lieutenant colonel and has been assigned to duty at the Army Base hospital at Seattle.

Dr. V. O. Ungherini, Butte, Montana, is the new president of the Silver Bow county medical society.

Dr. Joseph J. Kane, Butte, Montana, has been named county physician for 1942. He succeeds Dr. J. L. Mondloch who has held the post for six years.

Dr. A. S. Hoon, Chinook, Montana, has been named head of the Blaine county health-medical committee.

Dr. W. F. Baillie was elected president of the board of directors of the Fargo (North Dakota) clinic at the annual meeting of the group, January 12. Other officers are: Dr. T. P. Rothnem, vice-president, and Dr. O. J. Hagen, secretary-treasurer.

Necrology

Dr. Charles A. Durkee, 62, of Abercrombie, North Dakota, health officer of Richland county, died in a Fargo hospital February 19, 1942. Dr. Durkee spent his childhood in Frederick, South Dakota, attended college at Keokuk, Iowa, and the University of Illinois. He was graduated from medical school in Chicago in 1908 and a short time later moved to North Dakota to begin practice. He practiced at Morton, Lidgerwood and Fairmount before moving to Abercrombie six years ago.

Dr. Harry M. Freeburg, 65, of Watertown, South Dakota, died at the home of his sister in Tama, Iowa, January 4, 1942, after an illness of two months. Dr. Freeburg, founder of the Northwestern Clinic, had practiced in Watertown since 1905. He was chief of staff of the Luther hospital at the time of his death. Of him, Dr. Larsen writes: "He was unstinting in his devotion to his calling, gave unsparingly of his energies and lived an active and a helpful life."

Dr. Charles B. Harris, 84, of Pembina, North Dakota, died at his home January 2, 1942. He was North Dakota's oldest physician in years of practice, had served pioneer Pembina county since 1882. He was graduated from the College of Physicians and Surgeons, Baltimore, Maryland, in 1880, and began his first practice in Martinsburg.

The JOURNAL LANCET

Minneapolis, Minnesota
April, 1942

Vol. LXII, No. 4
New Series

The Industrial Front

Kendall Emerson, M.D.†
New York City, New York

Three hundred and fifty million work days lost annually through illness of the gainfully employed is our country's discreditable record. At a wage of five dollars a day this means a $1,750,000,000 yearly deficit in labor and production. Assuming that half of this is due to preventable disease we could build a dozen battleships in the time saved by full use of known preventive measures.

In working days lost per case, tuberculosis heads the list of unnecessary disabilities. This national loss is not due alone to doctors, nor the public health service, nor the ignorance and carelessness of the people themselves. The blame belongs to all three. The fervor of patriotism sweeping the country keeps our eyes fixed overseas. We are united in the will to annihilate despotism and re-establish freedom for all nations. This is our duty, but we must not forget the treacherous enemy within our own boundaries. Tuberculosis is in collusion with its fellow fifth columnists and is stabbing us in the back, impeding victory by a campaign of sabotage behind the lines.

The armed forces have foreseen the menace of tuberculosis in the ranks and are taking active measures to combat it. Industry has awakened to the threat but is still floundering in its efforts to thwart it. The medical profession is only half alive to its opporunity for patriotic service. Right now is the moment to stand by the men who make the guns in an all-out fight to eradicate this leading saboteur of victory.

Civilian physicians need feel no chagrin when they see their colleagues in uniform. They can serve their country with the same high patriotism and with more lasting benefit to its health if they will solemnly agree to press relentlessly and with reborn ardor the fight along the home front for the conquest of tuberculosis.

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†Managing Director, National Tuberculosis Association.

The Man of the Future in Tuberculosis Control

A. A. Pleyte, M.D.†
Harold Holand‡
Milwaukee, Wisconsin

THE two great upper Mid-Western states of Wisconsin and Minnesota now rank first and fourth, respectively, in the proportion of their tuberculosis cases currently isolated in sanatoria. According to the 1941 Hospital Number of the *Journal of the American Medical Association,* Wisconsin, with 830 recorded tuberculosis deaths during 1940, had an average daily sanatorium population of 2,093 patients or a ratio of 2.52 sanatorium patients : 1 death. Minnesota, with 760 recorded deaths, had an average sanatorium population of 1,848 patients, or a ratio of 2.43 patients : 1 death. North Dakota with a ratio of 2.50 ranks third in the country.[1] These ratios compare with the national ratio of 1.10 patients per death currently isolated in sanatoria. Insofar as the isolation angle of sanatorium care is concerned, at least, the three states here named of the Upper Middle West are more than twice as far advanced as the country as a whole.

In any analysis of what the future holds in tuberculosis control, at least in our part of the Middle West, the fundamental fact must be realized, then, that the treatment of the disease is rapidly becoming a problem of public supervision. During the last thirty years, a pattern has gradually been developed for the treatment of tuberculosis: bed rest, good food, fresh air, surgical intervention as indicated, and all of them in a systematized regime which is practicable as a rule only in sanatoria. In general, the public has been educated to the value of sanatorium care, and state and county legislative bodies have made generous and far-seeing provision for the public care of tuberculous patients. In the trinity of diagnosis, treatment, and after-care, there can be little doubt that treatment, which is the most costly of the three, is also the one most adequately handled.

Today, in January, as these words are written, the President is reporting to Congress on "the state of the Union." In any analysis of the future of tuberculosis control—or its immediate future, at least—this "state of the Union," it seems to us, must also be taken into account. America is no longer a slap-happy democracy working out its own salvation in its own easy and unhurried fashion. To save our basic American freedoms, it seems inevitable that we shall have to reconcile ourselves to a certain amount of rationing of national energies, as well as of raw materials. Tuberculosis control, like most other community efforts, requires men and material, and America has little enough of either. If we accept these dicta as axiomatic in consideration of our problem, the question of the proper direction which tuberculosis control should take in the immediate future resolves itself largely into more efficient and economical case-discovery and more efficient and economical after-care. Inadequate as are sanatorium facilities in many parts of the country, and many as are the weaknesses in institutional care even in our Middle West, the fact remains that there *is* a program, and that generally speaking it is working out fairly well.

In the other two segments of our tuberculosis trinity, case-discovery and after-care, we have many more or less independent efforts of varying degrees of productiveness. However, we cannot be blind to the fact that for all of our "early diagnosis campaigns," 80 to 85 per cent of the patients entering sanatoria with frank pulmonary tuberculosis are advanced upon admission. Despite our excited efforts at rehabilitation, likewise, a high proportion of patients discharged from American sanatoria with medical approval are dead or have relapsed within five years after discharge.

These facts cannot be ignored. They point in a challenging way to a need for persistent economical search for new cases and constant observation of discharged patients and their families. It seems probable that the man of the future in tuberculosis control, whoever he may be, will be that man who will introduce more efficiency with more economy into case-discovery, or after-care, or both.

When we look at the problem of case-discovery, we become struck at once by the diversity of pattern in the matter of public control programs as compared with the relative similarity of pattern in the matter of treatment. Fifteen years ago, the stethoscope was the basic tool in large scale diagnostic efforts just as it was in the private physician's office. Ten years ago was begun the great crusade of the tuberculin test and X-ray, in which literally millions of persons, mostly school children, were examined. The last three years have seen a growing reaction to what had come to be an almost slavish acceptance of this recipe. Two other mass diagnostic agencies are rapidly forging to the front: fluoroscopy, and photofluorography by either 4"x 5" or 35 millimeter films.

Now all of these large scale case-discovery programs and their *modus operandi* are activated by a desire to apply the technics and economies of the factory assembly line to the discovery of tuberculosis in human beings. That these programs should continue (and even amplified though better organized on a more selective basis) goes without saying. But that they are not the whole answer to the problem of finding cases early or anywhere near the complete answer becomes more obvious each year. Finding the actual case among the apparently healthy is something like finding the proverbial needle in the haystack: it can be done, but it takes time. And time, like men and materials, is a precious commodity today.

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†Director, medical department, Wisconsin Anti-Tuberculosis Association.

‡Statistician, Wisconsin Anti-Tuberculosis Association.

But the "apparently healthy public" in the mass, like "John Q. Public" in the singular, is very far from being a nicely defined and uniform entity. A cross section of the "apparently healthy" in Minnesota or Wisconsin would normally be expected, on the basis of mortality, to have only a little over half the tuberculosis morbidity of an equal sampling of the Illinois population. So, too, using mortality again as our index—in the lack of dependable morbidity records—a cross-section of "apparently healthy" population in many of the northern counties of Minnesota and Wisconsin would normally be expected to have twice or more the morbidity of an equal segment of the population from the southern counties of the two states. A sampling of the population within these northern counties from one nationality with a high rate—as for example, Finns—may be expected to yield a far higher incidence than an equal group of native born of native parentage. One might go through other variables—sex, age, race, economic level, occupational group, and so on. Tuberculosis has well been described as an "index disease"—its incidence varies sharply with the presence or absence of aggravating social problems.

In a much discussed article in *The Survey Graphic* a year ago entitled "No More Tuberculosis by 1960!" Louis I. Dublin pointed out the need to "increase measurably our personnel, medical and social service, and train these people more adequately for their respective tasks. We shall, furthermore, be wise to direct our new efforts at more carefully selected objectives than we have in the past. We shall need to concentrate on special groups." He lists some of the population segments indicated above and advocates drastic extension of federal facilities for case-finding and treatment.

While emphasizing the need of more and better staffed public diagnostic clinics, Dr. Dublin gives relatively little attention to the practicing physician as an agency in case-finding. Yet the spotty distribution of tuberculosis incidence which provides not only an opportunity but an obligation for intensification of public case-finding with emphasis on key groups, finds its parallel in the physician's practice. One physician lives and works in a tuberculosis-saturated community, another in a community with low incidence. One has a heavy practice among certain nationality groups afflicted with high tuberculosis rates, another does not. One sees many patients from low economic brackets, the practice of another is largely in a higher bracket. One has many patients coming to him from industries having more than a normal incidence of the disease, another sees few of them.

How many of the physician readers of the Journal-Lancet *have taken the trouble to inform themselves of the tuberculosis rate of their community as compared with that of other communities? How many have analyzed the social and economic make-up of their own particular practice? How many, having done so, have considered their opportunity and obligation for watching more intently than they would otherwise for the particular tuberculosis hazards of their own particular patient load?*

This matter of spottiness of distribution, and its application in terms of the private physician, may be seen in even clearer detail if we consider the matter of contact. Various studies have indicated that the incidence of active tuberculosis is some thirteen to sixteen times greater in contact families than in the general population.[2] Every health department is therefore wisely concerned—or should be—in tracking down these contacts, particularly of open cases, and having them checked periodically. Yet by some perversity of human nature, it is these contact families which require all too often the most intensive and expensive social service to be persuaded to appear at public clinics.

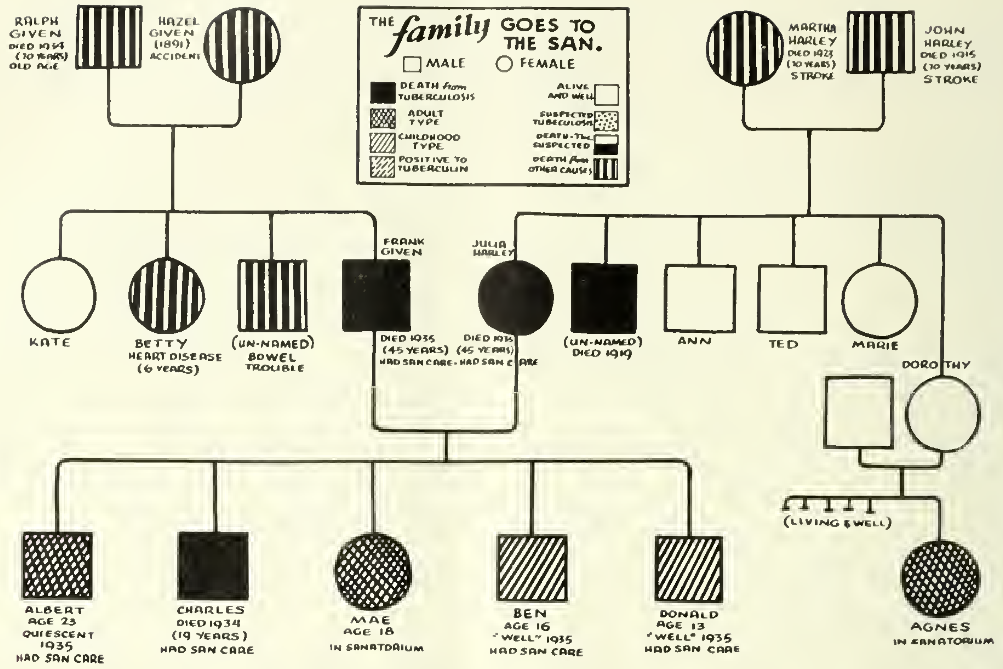
Contacts, whether led from room to room through the marble and terrazzo corridors of a metropolitan clinic, or examined by the flickering light of kerosene lamps in an ill-heated, ramshackle house on a rural delivery route —contacts, wherever reached, must be reached on an individual basis. The fact of their contact must be established and this means a family history. And "nobody, so much as the family physician," to quote the great anti-tuberculosis pioneer of Wisconsin, Dr. Hoyt E. Dearholt, "has the opportunity to know and learn" these family histories.

For years it has been a practice of public health epidemiologists to use graphic charts and maps in tracing sources of epidemics of acute contagious disease. In the particular field of tuberculosis, Opie and his associates at the Phipps Institute, in Philadelphia, and Pearl and his associates at Johns Hopkins have likewise traced individual and family histories in graphic form to see how much, or how little, the disease runs an endemic course through these families. Figure 1, a graphic representation of one Wisconsin family, is based upon an adaptation of these methods. Two parents died in the prime of life; both are known to have had tuberculosis. Were their children properly examined? The record is silent. But this the record does reveal: *all five of their children were sooner or later to require sanatorium care.*

For the past thirteen years the Wisconsin Anti-Tuberculosis Association has obtained month by month copies of tuberculosis death certificates from the State Board of Health. By research cross-check nearly eight hundred families have been located which have had two or more tuberculosis deaths. Many families have had three, four, and five deaths; one family, in fact, has had seven deaths during these years, another eight. Information furnished by sanatoria, public health nurses, and physicians signing death certificates of members of these families indicates that as many as 10 per cent of the intimate family contacts examined may have the reinfection type of this disease.

There is nothing esoteric about these charts of tuberculous families. There is nothing complicated about them. But there is a tremendous amount that is revealing—the thread of infection, disease, and death that is seen to run through a family, on the one hand, the ominous blank spaces, on the other, that stand for individuals whose status is not known, and whose status may

Fig. 1.


THE *family* GOES TO THE SAN.
MALE
FEMALE
DEATH from TUBERCULOSIS
ADULT TYPE
CHILDHOOD TYPE
POSITIVE TO TUBERCULIN
ALIVE AND WELL
SUSPECTED TUBERCULOSIS
DEATH-The SUSPECTED
DEATH from OTHER CAUSES
RALPH GIVEN DIED 1934 (70 YEARS) OLD AGE
HAZEL GIVEN (1891) ACCIDENT
MARTHA HARLEY DIED 1923 (70 YEARS) STROKE
JOHN HARLEY DIED 1915 (70 YEARS) STROKE
KATE
BETTY HEART DISEASE (6 YEARS)
(UN-NAMED) BOWEL TROUBLE
FRANK GIVEN
DIED 1935 (45 YEARS) HAD SAN CARE
JULIA HARLEY
DIED 1935 (45 YEARS) HAD SAN CARE
(UN-NAMED) DIED 1919
ANN
TED
MARIE
DOROTHY
(LIVING & WELL)
ALBERT AGE 23 QUIESCENT 1935 HAD SAN CARE
CHARLES DIED 1934 (19 YEARS) HAD SAN CARE
MAE AGE 18 IN SANATORIUM
BEN AGE 16 "WELL" 1935 HAD SAN CARE
DONALD AGE 13 "WELL" 1935 HAD SAN CARE
AGNES IN SANATORIUM

never be known, barring a little garden-variety epidemiological study by the family physician, till advanced tuberculous disease casts forth its baleful light.

Here, then, are two aspects of case-discovery in which the family physician, it seems to us, has a preeminent place. There is, first, the "spotty distribution" of morbidity in the various social and economic layers of the population which finds its parallel in the physicians' practice. There is, second and more important, the "black spots" of disease and death in tuberculosis-saturated families. In these two aspects of the problem, the family physician has the opportunity to take the leadership in case-discovery. If he does not, society, through its organized public health machinery, will assuredly take it instead.

We come, then, to the third part of the tuberculosis trinity: after-care. Five years ago one could be somewhat cavalier—and many tuberculosis workers were—about this matter of rehabilitation. With direct relief agencies, WPA, CCC, NYA, and the various Social Security aids all trying to help the unemployed, and with no end to it in sight, there seemed relatively little use to many persons in spending a great deal of time, money, and effort to re-train and direct ex-patients, physically handicapped to a certain extent at best, in order that they might compete with physically normal persons for the few existing jobs. It seemed more profitable to devote the major portion of time, money, and effort that was available toward early discovery work, on the assumption that earlier case discovery would obviate much rehabilitation effort years later.

But that was five years ago. There is more serious business afoot in America today than even our tuberculosis fight. The very existence of the nation is at stake. With millions of our healthier young men going off to war, and with the national productive capacities taxed to the utmost, even the physically handicapped must be pressed into the job of building machines that will enable the army to fight and the civilian population to live and work. This need affects our tuberculosis problem in various ways. Wisconsin sanatoria are already finding patients less willing to remain for the full span of the cure-taking process; the tug of waiting jobs is too great. For workers now on the job, whether ill or well, hours are being lengthened, strains increased. Men and women, regardless of their physical capacities, are being hastily recruited and thrown into jobs needing to be filled. The regular public health machinery, in the shuffle of new demands upon it, is in danger of losing the ex-patient from its regular public health nursing follow-up. These things are more or less inevitable, and must be taken in the stride of a re-arming nation. But in their stride, they may forfeit the recovery of many patients.

This brings us to our second major point. Realizing that ex-patients are needed in the nation's economy, that their physical condition needs watching as never before, and the handicaps imposed upon regular public health machinery by the pressure of other demands, *who is better fitted than the family physician at the moment to watch over the physical health of the discharged sanatorium patient?* Competent medical supervision is the *sine qua non* of any program of social rehabilitation of the tuberculous. The individual physician may have within his practice one, two, or half a dozen recovered sanatorium patients. In a normal economy, his responsibility to these individuals may cease with their resumption of work. But with the staggering demands upon the nation for the conservation of resources, particularly of the manpower which creates *materiel,* does not the physician's responsibility continue *after* resumption of work by his patient—a responsibility not so much to the patient, perhaps, but to the nation?

There appear, then, to be great opportunities and obligations in the immediate future toward a more economical and efficient program of case-finding and aftercare. These opportunities and obligations appear as a particular challenge to the family physician. Whether he will be the man of the future in tuberculosis control, we do not know. But he can be, we believe, if he chooses to meet the challenge.

References

1. Journal of the American Medical Association 116:1064 (March 15) 1941. National Tuberculosis Association, special release No. B 567. Ratios worked out by Statistical Department, Wisconsin Anti-Tuberculosis Association, Milwaukee.

2. Downes, Jean: How Tuberculosis Spreads in a Rural Community, American Journal of Public Health 26:30 (Jan.) 1936.

3. Harmon, G. E.: Willingness of Individuals to be Examined for Tuberculosis, American Journal of Public Health 32:187 (Feb.) 1942, giving a case rate per 1,000 examined (reinfection type tuberculosis) of 3.03. This may be compared with statistics cited by G. J. Drolet at the Atlantic City meeting of the American Public Health Association, 1941, in discussion of Dr. Harmon's paper in which some 160,000 clinic examinations in London, Chicago, and New York City yielded 5 per cent tuberculosis findings, or 50 per 1,000 examined.

The Control of Tuberculosis Among Medical Students[*]

With Additional Reference to Interns and Student Nurses

E. Richard Weinerman, A.B.
Frederick O. Coe, M.D.
Washington, D. C.

It is now definitely recognized that the problem of tuberculosis in students of medicine is important and merits serious consideration. The peculiar exigencies of the study of medicine necessarily produce the hazard of tuberculous infection, and the significantly high incidence of disease that results represents a definite challenge to those responsible for student and public health. A previous survey by the Student Health Committee of the Association of Medical Students[38] arrived at the conclusion that "Tuberculosis is the major occupational hazard of medical students." Heath of the Harvard Student Health Service remarked[14] that "there is no doubt that tuberculosis is the most important organic medical problem in medical school."

The situation has become more and more apparent, revealing a state of affairs wherein the very men being trained to protect the nation's health are themselves allowed to succumb to a largely preventable disease. The subsequent loss of health, time, money, and, indeed, life in young students is thereby all the more appalling.

Myers warns:[10] "If we continue to expose during training our students of Medicine and Nursing we cannot expect anything but a harvest of illness and death. Not only is this poor economy and crass negligence, but we are undermining all our previous accomplishments in the education of the public in the prevention of tuberculosis. If we do not practise what we preach, we cannot expect the lay public to do so."

This study, then, is dedicated to the proposition that a definite problem exists, and that the current isolated attempts at its effective solution must be acknowledged, correlated, and improved.

Incidence

Hetherington and associates, working with student tuberculosis have observed:[22]

"The number of young adults with apical lesions of tuberculosis increases gradually with increasing age, but the incidence of these lesions in medical students, increasing rapidly in successive years of the medical course, . . . indicates that they are peculiarly subject to grave tuberculosis infection."

At the University of Minnesota it has been reported[42] that in a student body of approximately 12,000 the number of students enrolled in the schools of Nursing and Medicine is a relatively small group; yet there is an overwhelming preponderance of lesions in this minor group.

There is much evidence for the fact that high student incidence rates occur predominantly in those doing medical work. At the University of Pennsylvania it was reported[41] that the Liberal Arts School produced only one case of tuberculosis in every 279 students, while fifteen cases out of 452 students were found in the Medical School. To eliminate the age factor, the same investigators compared incidence rates in the schools of Medicine, Dentistry, and Law, and reported[42] a significantly higher incidence in the medical group. Boynton et al have similarly shown[33] the greater incidence of tuberculosis in nurses and medical students by detailed statistical comparisons with the infection rates in other university departments. Dufault[14] cites Hedvall's findings at Lund University in Sweden: Medical students—11.3 per cent; philosophy students—1.2 per cent; law students—1.8 per cent.

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[*] From the department of radiology, Georgetown University School of Medicine, Washington, D. C.

From medical schools throughout the country have been reported high incidence rates. With some exceptions (*vide infra*) they are significantly higher than the expected rate among the same age and economic groups in the general population. Woman's Medical College reported fifteen cases in 107 students;[42] University of Minnesota Medical School, 18 cases in 305 students;[33] England's University College Hospital Medical School, twenty-six cases in 417 students.[19] Similarly, there is noted a 5.8 per cent rate in two years at the University of Pennsylvania Medical School;[14] ten cases in five years at Johns Hopkins Medical School,[21] and nineteen cases in four years at the University of Michigan Medical School.[23]

Most of the above figures refer to early reports, and reflect conditions as they existed before or without adequately established anti-tuberculosis programs. The figures at Pennsylvania and Minnesota, in particular, dropped significantly after the institution of control efforts. It is regrettable that many schools even today have set up no effective program, and would still reveal such high incidence rates. In fact, the report[38] of the Association of Medical Students' Committee on Student Health estimated an average tuberculosis rate of 7 per cent in all medical schools. That this rate is significantly above levels reported in the same age group of the general population has been emphasized by a study of tuberculosis in draftees under the Selective Service Act, Plunkett reporting[35] an .047 per cent infection rate in all registrees in 1939.

The figures presented by many schools at which control efforts have been made are more reassuring. Hahn reports[18] only an 0.2 per cent incidence at Cornell, Columbia shows an 0.4 per cent case rate as cited by Flood,[14] and equally low incidences obtain at Stanford,[42] Wisconsin,[44] Yale,[42] and other schools with well established health programs.

It must be emphasized that the evaluation of incidence statistics depends largely upon the presence or absence of control programs, for schools with no detection activities do not find all the cases. With the establishment of a new diagnostic service many hitherto undetected cases bring the incidence rates to a maximum figure. Then as the infection control work takes effect, most cases should be prevented and a low case rate be reobtained, this time based on actualities. It is with these relationships in mind that any published figures should be considered.

EXPOSURE

The veritable universality of exposure of medical students to tubercle bacilli is amply demonstrated in the many reports of mass tuberculin testing. It is a common experience to find 50 to 60 per cent of entering students positive to skin tests, and 90 to 100 per cent of students positive four years later at graduation. Time and again such reported statistics have shown that few medical students, if any, entirely escape contact with the potentially malignant bacillus. Baker and Holoubek report[6] 68 per cent positive reactors at Louisiana State Medical School in the first year class, and 98 per cent at graduation. Lees reports[26] that 60 to 68 per cent are reactors in the first year at the University of Pennsylvania Medical School, and that 98 to 100 per cent react positively at graduation. Diehl and associates[33] have established the control factor by demonstrating that the percentage of negative reactors remained almost constant during the four years at the College of Education at the University of Minnesota, while students in the schools of Medicine and Nursing showed tuberculin test figures like those above, that is, the half of the class originally non-allergic to tuberculin gave positive reactions after clinical training. And so it goes in almost every school in the country, with practically every graduating medical student manifesting a sensitization to the tuberculin test material. Myers says (personal communication), "I do not see how we can possibly avoid the conclusion that the stage is set for the development of clinical tuberculosis in anyone who has a tuberculin reaction. Of course, not all such persons develop the disease, but they all have the potentialities."

ETIOLOGICAL FACTORS

The prime factors in student infection seem to be mainly three: (1) contact with patients, (2) personal resistance, and (3) laboratory exposure. Thorough appreciation of the factors of infection are basic to any preventive measures.

1. *Clinical contacts.* By far the most important source of medical personnel tuberculosis is the tuberculous patient. The transfer of bacilli from patient to attendant is accomplished most commonly by direct droplet projection, mainly during coughing and expectoration. Improperly handled napkins, sputum cups, bed clothes, food utensils, and the like, are all potential reservoirs of bacilli. Dufault has shown[14] that positive cultures of tubercle bacilli are obtainable also from laundry water, and from tables, walls, and floors of routinely cleansed tuberculosis wards. Infection is courted by carelessness in observing the proper ward technic, neglecting the use of gowns, masks, and handwashing, and wearing of used ward uniforms into the dining hall or living quarters.[13]

The fact that clinical contacts produce most student tuberculosis is indicated by the sharp rise in the number of positive tuberculin reactions occurring during the last two (i. e. the clinical) years in students who had remained negative during the pre-clinical years. "The infection rate among medical students during their clinical years is six times as high as during the first two years."[12]

The fact that almost 100 per cent of students are tuberculin positive following the clinical years shows definitely that contact with the tubercle bacillus is inescapable. Further studies have indicated also that contact is fairly continuous, and that the dosages of the bacilli are large. The dangers of the tuberculosis wards, on which all students must spend some weeks, are obvious.

One further point must here be stressed. The hazards of the tuberculosis wards with known tuberculous patients are well recognized, and usually combatted with definite technics. However, an insidious and often unappreciated source lies in the undiagnosed cases on the general wards. Here, no contagion technic is even considered, and unsuspected tuberculosis can be disseminated with ease.

2. *Personal resistance.* Educators have long stressed the importance of the resistance of the host in the pathogenesis of tubercle bacillus infection. Such resistance depends to some extent on constitutional and hereditary factors. A family history of tuberculosis is always significant, but the current health level of the individual is the fundamental factor in resistance to infection. The medical student has been traditionally connected with overwork, poor eating and sleeping habits, and improper housing. Most schools are not able to provide dormitories and supervise dining halls. The student is too often a frequenter of cheap restaurants and boarding houses, or a member of a crowded fraternity house, where one man's infection is soon fraternally shared with all. For the most part, moreover, the student has little opportunity for exercise or relaxation. The constant combination of fatigue, improper nourishment, and unsatisfactory housing is obviously sufficient to lower natural resistance to disease. Some schools (i. e. Harvard, Columbia) have effectively faced this problem. Others are becoming increasingly aware of the potential dangers of lowered student resistance. So, Baker and Holoubek[6] opine that this factor is the most important one in the causation of student tuberculosis, since the greatest increase in the number of tuberculin reactors came in the pre-clinical years of Louisiana State Medical School. These men are alone, however, in considering this factor to be the most important one, for "lowered resistance" seems to be significant mainly when considered in connection with the students' constant exposure to the tubercle bacilli.

3. *Laboratory exposure.* Possibilities always exist for infection by the mycobacteria in the bacteriological and pathological laboratories and in the autopsy room. This, probably, is not too important a factor in the pathogenesis of student infection. Nevertheless, careless handling of tuberculosis tissues or cultures is always hazardous. The potential dangers of the necropsy table are stressed in the report[14] from Boston City Hospital, where 285 of 3766 routine postmortems, being performed with no especial precautions, revealed tuberculosis.

Of the three factors discussed, then, contact with tuberculosis, diagnosed or undiagnosed, is undoubtedly the most important.

Reported Control Efforts

This problem is by no means of recent vintage, and student health officers have long been active in the establishment of programs for prevention, early detection, and treatment. However, activity of this kind varies in effectiveness, from desultory measures consisting of cursory physical examinations and X-ray studies, when indicated by symptoms, to almost complete eradication of student infection by rigid control technics. The Committee on Student Health of the Association of Medical Students in 1938 sent questionnaires to the 67 approved Medical Schools. Of the 40 schools responding, only 25 had active programs, of which 21 were compulsory. Of these 25 schools with some activity only 11 at that time had established what shall be presented here as an adequate program. Stevenson[43] was led to say in 1939 that:

> "In the majority of instances, except for a more or less perfunctory physical examination, with, perhaps, chest films on admission, the scope of the services rendered rarely extends beyond the remedial care given to students who fall ill during the school sessions."

In the light of modern knowledge concerning the prevention of tuberculosis this apparent failure of so many medical schools to protect their own students, indeed, even to acknowledge the dangers involved, is appalling.

The tireless investigations of such workers as Myers, Stiehm, Lees, Amberson, and their associates, have demonstrated in actual practice that properly conducted control programs can meet the challenge. The pioneer work of Myers at the University of Minnesota has been inspirational[12,30,31,34] There, all entering students are tuberculin tested, and negative reactors are retested periodically. All positive reactors are X-rayed at once and then every six months. By such measures a pulmonary lesion rarely goes undiagnosed beyond the very early minimal stage. The preventive aspects are equally well stressed, with strict isolation technic on the tuberculosis wards of the university hospitals, detailed education of patient and attendant, and elimination of the tuberculous from the general wards. This last is one of the greatest achievements at Minnesota as X-ray inspection of the chest is made on every hospital admission, regardless of the Service involved. With similar measures student infection has been almost eliminated at the University of Wisconsin Medical School.[44]

Student tuberculosis has long been the subject of investigation[22,23,26] at the University of Pennsylvania Medical School, where refined methods of large scale roentgenography and careful student supervision have succeeded in greatly decreasing the previously alarming infection rate. Prior to 1935 a rate of almost 6 per cent had been reported. A control program was then instituted, and the incidence five years later had dropped to 3.7 per cent.[23] Significantly, the rate is decreasing yearly. Workers in New York report[18] a low student incidence, and ascribe much of their success to proper regulation of student living conditions. Edwards emphasizes[15] the importance of ward instruction, as well as personal resistance, writing that "from an educated consumptive a well-fed, well-housed, properly conducted (student) is not likely to contract pulmonary tuberculosis."

Substantial contributions in the direction of reducing the cost of routine mass roentgenography have been made. Cestero in Puerto Rico described[9] a method of photographing the fluoroscopic image and then projecting its magnification on a screen for reading. These so-called "fluorographs" cost but one cent apiece. Similarly, Lees reported[26] the economy and efficiency of using paper film and the Powers Rapid Survey method in X-raying large numbers of students. At a recent symposium[46] of Army, Navy, and civilian chest physicians, "streamlined" radiographic procedures were described, such as the 4 x 5 inch paper film and the 35 mm. fluorophotographic film. The former, indeed, has been recommended to the Army, and the latter has been adopted by the Navy. Even before the introduction of cheaper roentgenography Amberson had pointed out[1] that the cost of control programs does not seem extreme when considered in comparison with the cost of treating one full blown case of tuberculosis. This amounted to $5,000 in the case of one of his student patients, who subsequently died.

The work at Georgetown University School of Medicine has hitherto been unreported. Previous to 1939 no systematic Student Health Service existed, and since many student infections went undetected, a false sense of security was felt. After the departments of Preventive Medicine, Radiology, and Tuberculosis combined in the establishment of a program that includes easily available medical service for all students and annual X-rays, seven pulmonary infections were detected. These lesions were picked up in minimal stages and comparatively easily controlled by prompt treatment, thus demonstrating the profound importance of early diagnosis. It is expected that as parallel preventive measures succeed in controlling the dissemination of bacteria, low incidence rates will reflect actually few cases of infection, and not low percentages of detection. At Georgetown Medical School each student pays a $10 yearly health fee, which entitles him to an annual physical examination, chest film, and urinalysis, unlimited use of the student physician's office, and a free hospitalization plan. Demonstrations in proper tuberculosis ward technic precede each clinical clerkship in the tuberculosis service.

At the University of California at Berkeley a program for "the detection of abnormalities of the chest, especially tuberculosis," has been inaugurated.[45] The routine chest roentgenography is done by the photofluorographic method described above.

Many other centers (New York University, Stanford University, Yale, Harvard, etc.) have effective programs, and the form is becoming clearer and more standardized for efficient tuberculosis control among students. The value of such diagnostic services cannot be overemphasized. For where no program exists, newly acquired tuberculous infections go untreated until the stage wherein severe lesions produce tell-tale symptoms. Therapy then includes long periods of bed-rest, often operative procedures, with a resulting more unfavorable prognosis. Schools with routine detection programs will pick up lesions almost at their onset, at which time promptly instituted treatment can be of relatively short duration and produce a great percentage of arrests.

RECOMMENDED CONTROL PROGRAM

The marked success of control programs at those schools actively fighting student tuberculosis inexorably points the way to the ideal, toward which all Student Health Services must strive. These plans must be expanded (or created, if necessary), allied with Preventive Medicine, Radiology, and Tuberculosis departments, and firmly dedicated to the twin principles of prevention and early detection. Again, Myers has made an important contribution by making the control program an integral part of the students' course in Preventive Medicine. In this scheme the students themselves are responsible for the adequacy and continuity of the program, and thus are impressed with the principles of disease prevention in general, as well as tuberculosis control in particular. This idea merits detailed consideration by all schools for administrative and educative reasons. Indeed, Dean Diehl of the University of Minnesota Medical School has warned[12] that "certainly we can expect the students to take what they hear and read about the importance of periodic health examinations with many grains of salt if the faculties of our medical schools evince no interest in them."

The ideal program has evolved from years of clinical observation and from the happy results of control measures based upon these observations. The first emphasis of the program must be on prevention. As the prime factors in infection were shown to be environment and contact with patients or laboratory materials, so the preventive efforts must be directed against just these sources.

Toward elevating the levels of student resistance, the living and eating conditions of the students should be supervised and maintained at standards compatible with good health. School officials should concern themselves perhaps more directly with these non-academic problems of their students. Proper opportunities for recreation and exercise should be provided in the curriculum. Attention should be focused on the potential reservoirs of infection in restaurant and boarding house employees as well as hospital personnel, especially the food handlers. In addition, every precaution must be taken in the autopsy and laboratory rooms to prevent the escape of the tubercle bacilli that are confined in tissues and cultures. Indeed, the number of autopsies on tuberculous patients should not be excessive, and proper observance of mask and glove technic should be stressed.

The crux of the matter, as we have seen, lies in the spread of the bacillus from patient to student. To combat this danger, first of all a determined attempt must be made to screen all cases of tuberculosis away from the general wards, by routine admission chest films, if possible. At any rate, diagnostic suspicions should be confirmed by careful histories and examinations, with X-ray and sputum cultures for all patients complaining of respiratory symptoms, fatigue, indigestion, and the like. Once all the tuberculous are isolated on separate wards, complete contagious disease technic must be enforced. Gowns and masks must be worn by all attendants while on the wards, and hand-washing after contact should be habitual. Combustible paper cups for sputum and paper napkins for covering the mouth when coughing must be provided for each patient. Washing of bed clothes and food utensils must be specially directed toward effective extermination of the tenuous mycobacteria. Education is basic for success in prevention, and the educative process must be directed toward patients, students, and attendants alike. The control of droplet infection, avoidance of contamination, in short—proper respect for the lethal bacilli—should be the message of the educator. All the rules of contagion-ward technic, which are so assiduously observed in the event of the relatively inocuous measles, must be enforced if the menace of tuberculosis is to be eliminated from the medical course.

Despite all efforts at prevention the constant contact with bacilli may still produce infection in a small number of students. Equally important in the campaign, therefore, are the attempts at early detection of the minimal lesion. It is now axiomatic that good prognosis in tuberculosis depends directly upon early diagnosis and prompt treatment. Equally well established is the fact that minimal lesions produce little or no symptomatology and seldom are revealed by physical examination. Periodic X-ray is the only sure method of early recognition of the disease. A program, therefore, that succeeds in bringing all incipient cases to light before significant progression of the disease occurs will go a long way toward eradicating the mortality and materially reducing the morbidity associated with this infection. Toward this end the following detection schedule is offered, having been suggested by a complete review of the pertinent literature. Its adoption by all Student Health Offices that are as yet without adequate activities is strongly urged.

Each student should be tested with full strength tuberculin on admission to school. (This test should be a part of the complete physical check-up on entrance). Negative reactors should be retested every six months as long as they do not react. Positive reactors on admission and newly reacting students should be X-rayed at once and every six months thereafter. Needless to add, every significant lesion must be carefully observed for evaluation of activity and treated according to the best principles of modern knowledge. The time at which originally negative reactors become positive is known to be potentially dangerous, and such students should be carefully watched. American phthisiologists are emphasizing the fact that a positive tuberculin reaction is a definite indication that the body harbors the tubercle bacillus and that the stage is thus set for the malignant "secondary" type of tuberculosis. Periodic tuberculin testing is thus the guide to intelligent roentgenology, just as the latter is the basis for early diagnosis, so essential for successful treatment. Neither the test nor the chest film are dispensible, for the routine application of both procedures brings to light many cases which may have been missed by the use of either one alone.

It must be re-emphasized at this point that the total cost of such a program is (1) not as prohibitive as supposed, especially when properly integrated into existing health services, and (2) intensely worthwhile when compared with the cost of treating one or two full-blown cases of tuberculosis. As for the cost of mass X-ray, moreover, the newer methods of large-scale roentgenography have proved that the expense can be reduced to levels more compatible with school budgets. Arrangements whereby nominal and all-inclusive health fees can be collected from the students are possible and can be worked out at individual centers. Some such modest health fee may defray a substantial portion of the cost of the program. Finally, to assure complete success in this important work, participation in the program must be compulsory for every student.

Tuberculosis Among Interns

If the need for a real anti-tuberculosis campaign can be made convincing on the basis of medical student statistics alone, then the necessity for control of the disease in those who actually live in the hospital is obvious. Interns and nurses work, perhaps, under greater strain and in more constant contact with tuberculous patients than do medical students. As a result, tuberculosis is a hazard of equal, if not of greater significance among hospital personnel. The Committee on Intern Health of the American Medical Association reported[37] that tuberculosis is the major health hazard of interns, accounting for about 60 per cent of all serious disease in these young doctors. This committee suggested that "each hospital should make it a rule to require chest roentgenograms of its interns at least at six month intervals."

Tuberculosis Among Student Nurses

Tuberculosis takes its greatest toll among young females, accounting for 29 per cent of all deaths occurring between the ages of 20 and 25.[3] When large numbers of young girls are placed in intimate contact with consumptives, the conditions are perfect for high infection rates. This is exactly the situation in which thousands of student nurses are placed. Ever since the work of Heinbeck in Oslo the seriousness of this health menace to student nurses has been appreciated. Infection rates among nurses in hospitals without control programs, or before the institution of such, have been well above general population levels: 10 per cent reported by Shipman and Davis,[41] 6 per cent by Rhoads et al,[39] 6 to 7 per cent by Badger and Spink,[5] 12 per cent by Heinbeck,[20] etc. Dr. Ruth Boynton has demonstrated,[30] again at the University of Minnesota, that tuberculous infection was 100 times more prevalent in student nurses than in the regular college girls, and 500 times more prevalent in those nurses whose training included a Tuberculosis Service.

The American Nursing Association reported[11] that 48 per cent of all nurses receiving aid from their medical relief fund had tuberculosis. The inevitability of contact with the tubercle bacillus by the student nurse is dramatically demonstrated (as it was in medical students) by the fact that 100 per cent of these girls react to tuberculin at the end of their three year course, whereas only some 40 to 60 per cent of them were positive at the start.

Many hospitals have succeeded in reducing these high infection rates by complete application of the above discussed principles of tuberculosis control. From 1920 to 1928 a 4.5 per cent case rate was believed to exist at the Ancker Hospital in St. Paul; a strict program of detection revealed a true incidence of 5.5 per cent in 1928 to 1930; and the success of a rigid control technic reduced this rate to 1.6 per cent by 1934.[17] Rigorous control efforts have been encouraging at Bellevue,[2] Philadelphia General,[41] Glenlake,[27] Cook County,[39] and many other hospitals. The ideal program should contain all of the features of the one already outlined for medical students, although more frequent periodic examinations are desirable. Especial emphasis must be placed on absence of overwork and on proper recognition of a young woman's need for rest and recreation. In appreciation of the peculiar susceptibility of the age group of student nurses some investigators have suggested that the Tuberculosis Service be eliminated from the nurses' training course, since it contributes nothing to the education of the nurse which could not be obtained in the other services. The nursing personnel for sanitoria and tuberculosis wards might well be obtained from the older graduate nurses.

At the present time it is believed that the B.C.G. vaccine is of little value and, indeed, that tuberculin positive nurses are just as liable to infection, if not more so, than negative reactors.[24]

That real application of these principles of tuberculosis control can succeed in protecting students of nursing from this greatest of occupational hazards has been inspirationally demonstrated at the University of Wisconsin, where not one case of student tuberculosis has occurred since the institution in 1935 of adequate protective measures. With available methods of prevention tuberculosis in students of nursing—as well as of medicine—can be controlled.

Summary and Conclusions

1. Tuberculosis is the most serious occupational hazard of medical students, interns, and student nurses.

2. The incidence of tuberculosis in these groups is significantly higher than that among comparable groups in the general population.

3. Almost every student of medicine and nursing is exposed to the tubercle bacilli during the years of clinical training, as shown by the tuberculin reaction statistics.

4. Contact with tuberculous patients, lowered resistance due to poor living habits, and laboratory bacilli—in that order—are the main factors in the production of student tuberculosis.

5. Proper control programs have already proved their effectiveness in reducing the dangers of tuberculous infection in medical centers.

6. Various new technics have materially reduced the cost of periodic mass roentgenography.

7. Adequate control programs must consist of:
   - (a) Establishment of Student Health Services with easily obtainable medical aid for all students.
   - (b) Admission health certificates and physical examinations.
   - (c) Compulsory tuberculin tests for all new students with semi-annual retests until positive reactions are obtained.
   - (d) Careful observation and management of all new reactors.
   - (e) X-ray of chest of all positive reactors at once and semi-annually.
   - (f) Prompt and complete treatment of all students with significant lesions.
   - (g) Adequate housing, eating, and recreational facilities for all students.
   - (h) Special care in autopsy and laboratory rooms.
   - (i) Proper precautions for sputum disposal, mouth-covering napkins, sterilizing laundry and dish washing on tuberculosis wards.
   - (j) Rigid isolation technic on tuberculosis floors.
   - (k) Education of patient, nurse, and medical student as to proper tuberculosis control procedures.
   - (l) Elimination of tuberculous patients from general wards by routine chest X-rays on all hospital admissions.

8. Incorporation of this program into the students' own courses in Preventive Medicine is suggested.

9. The adoption of this or similar control programs by all medical schools and hospitals as yet without such programs is strongly urged.

Bibliography

1. Amberson, J. B., and Riggins, H. M.: Tuberculosis among student nurses, Ann. Int. Med. 10:156, 1936.

2. Amberson, J. B.: Dividends from a tuberculosis control project among students, Journal-Lancet 60:186 (April) 1940.

3. Anderson, D.: Tuberculous infection in nurses, M. J. Australia 1:781 (June 8) 1940.

4. Arnould, E.: Tuberculosis among medical students, physicians, and nurses, Rev. de phtisiol. 13:630, 1932.

5. Badger, T. C., and Spink, W. W.: First infection type of tuberculosis in adults, New England J. Med. 217:424, 1937.

6. Baker, A. E., and Holoubek, J. E.: Tuberculosis in medical students, Am. Rev. Tuberc. 43:288 (Feb.) 1941.

7. Brahdy, L.: Tuberculosis in hospital personnel, J.A.M.A. 114:102 (Jan.) 1940.

8. Brahdy, L.: Tuberculosis in student nurses, New York State J. Med. 40:326, 1933.

9. Cestero, G. R.: Fluorography, Journal-Lancet 60:168 (April) 1940.

10. Quoted by Daner, C. C.: Tuberculosis in medical students, Internat. M. Digest 30:56 (Jan.) 1937.

11. Davis, P. V.: Tuberculosis among nurses, Dis. of Chest 6:214 (July) 1940.

12. Diehl, H. S., and Myers, J. A.: Tuberculosis prevention, immunity, and periodic health examinations among medical students, J. A. Am. M. Coll. 15:104 (March) 1940

13. Dobbie, W. J.: The need of a rational medical technique for the safeguarding of hospital personnel and medical students, Journal-Lancet 60:173 (April) 1940.

14. Dufault, P.: Tuberculosis infection among nurses and medical students in sanatoria and general hospitals, New England J. Med. 224:711 (April 24) 1941.

15. Edwards, P. W.: Tuberculosis in hospital workers, Brit. M. J. 4016:1261 (Dec. 25) 1937.

16. Ferguson, L. H.: Protection of unavoidably exposed persons against tuberculosis, Journal-Lancet 60:170 (April) 1940.

17. Geer, E. K.: Tuberculosis among nurses, Arch. Int. Med. 49:77 (Jan.) 1932.

18. Hahn, R. G., Muschenheim, C., and Freund, J.: Pulmonary tuberculosis in medical students and nurses, Am. Rev. Tuberc. 43:600 (May) 1941.

19. Hart, P., Hilton, G., Moreland, A.: Tuberculosis in medical students, Lancet 1:263 (Feb. 10) 1940.

20. Heimbeck, J.: Tuberculosis among nurses, Med. Klin. 29:1731, 1933.

21. Herman, H. B., Baetzer, F. H., and Doull, J. A.: Tuberculosis infection in medical students, Bull. Johns Hopkins Hosp. 51:41, 1932.

22. Hetherington, H. W., McPhedran, F. M., Landis, H. R. M., and Opie, E. L.: Tuberculosis in medical and college students, Arch. Int. Med. 48:734, 1931.

23. Hetherington, H. W., McPhedran, F. M., Landis, H. R. M., Opie, E. L.: Further study of tuberculosis among medical and other university students, Arch. Int. Med. 55:709, 1935.

24. Israel, H. L., Hetherington, H. W., and Ord, J. G.: A study of tuberculosis among students of nursing, J.A.M.A. 117:839 (Sept. 6) 1941.
25. Jennings, F. L.: Tuberculosis infection and morbidity among medical students and physicians, Minnesota Medicine 21:102 (Feb.) 1938.
26. Lees, H. D.: The control of tuberculosis among students at the University of Pennsylvania, Journal-Lancet 60:162 (April) 1940.
27. Mariette, E. S.: The tuberculosis problem among nurses in a tuberculosis sanatorium, Am. J. Nursing 36:605, 1936.
28. Quoted by Myers, J. A.: The control of tuberculosis among student nurses, Am. J. Nursing 30:1361, 1930.
29. Myers, J. A., Diehl, H. S., and Lees, H. D.: The student nurse and tuberculosis, J.A.M.A. 102:2086 (June) 1934.
30. Myers, J. A., Trach, B., Diehl, H. S., Boynton, R.: Tuberculosis in medical and nursing hospital personnel, Ann. Int. Med. 11:2181 (June) 1938.
31. Myers, J. A., Harrington, F. E., and Streukens, T. L.: Personnel, patients, and tuberculosis, Mod. Hosp. 54:58 (Jan.) 1940.
32. Myers, J. A., Boynton, R. E., Diehl, H. S., Streukens, T. V., and Ch'iu, P. T. Y.: Tuberculosis among students and graduates in nursing, Ann. Int. Med. 14:873 (Nov.) 1940.
33. Myers, J. A., Diehl, H. S., Boynton, R., Ch'iu, P. T. Y., Streukens, T. L. Jr., and Trach, B.: Tuberculosis among students and graduates of medicine, Ann. Int. Med. 14:1575 (March) 1941.
34. Ninth annual report of the Tuberculosis Committee of the American Student Health Association, Journal-Lancet 60:178 (April) 1940.
35. Plunkett, R. E.: Tuberculosis among selective service men in New York State, War Med. 1:611 (Sept.) 1941.
36. Queries and minor notes, J.A.M.A.: Tuberculosis in nurses, J.A.M.A. 103:1968, 1934.
37. Report of A.M.A. Convention: Committee on Intern Health, J.A.M.A. 116:2777 (June 21) 1941.
38. Report of survey by Student Health Committee of Association of Medical Students: J.A.M.A. 111:886 (Aug.) 1938.
39. Rhoads, P. S., Afremow, M. E., and Straus, E. C.: Tuberculosis in nurses, Cook County Hospital, Am. Rev. Tuberc. 40:444 (Oct.) 1939.
40. Riggins, H. M., and Amberson, J. B.: Detection and control of tuberculosis among nurses, Am. J. Nursing 40:1137 (Oct.) 1940.
41. Shipman, S. J., and Davis, E. A.: Tuberculosis in nurses, Am. Rev. Tuberc. 27:474, 1933.
42. Quoted by Soper, W. B., and Amberson, J. B.: Pulmonary tuberculosis in young adults, Am. Rev. Tuberc. 39:9 (Jan.) 1939.
43. Stevenson, P. H.: Medical student health, J. A. Am. Med. Coll. 114:345, 1939.
44. Stiehm, R. H.: Tuberculosis among University of Wisconsin students, Am. Rev. Tuberc. 32:171 (Aug.) 1935.
45. Student section reports: J.A.M.A. 117:1477 (Oct. 25) 1941.
46. Symposium on X-rays of the chest: Dis. of Chest 7:312 (Oct.) 1941.
47. Welborn, M. B.: Incidence of tuberculosis among personnel of the college of medicine, University of Cincinnati, J. Med. 18:563 (Jan.) 1938.
48. Whitney, J. S.: Tuberculosis among nurses, a summary of the literature, Am. J. Nursing 35:1, 1935.

Tuberculosis Occurring in High Schools*

Kathleen B. Jordan, M.D.

Granite Falls, Minnesota

WHAT happens to the percentage of positive reactors to tuberculin in a school where one or more of the students develop active pulmonary tuberculosis? This paper reports the findings in four such schools. In all four schools the tests were given and read by the same person. The Mantoux method with a dosage of 0.1 mgr. of Old Tuberculin was used and all the tests were read in 48 hours. (These surveys were financed by the local Christmas Seal fund.)

School A

School A is a small consolidated school with a total enrollment of around 220—a High School enrollment (9th to 12th grades inclusive) of 100. A high percentage of these high school pupils come in from rural areas daily on school busses. One such student was E. F. who first came to School A as a freshman in the fall of 1935. At that time he was a husky lad who soon became an excellent athlete and basketball player. His health remained good until his senior year (spring, 1939) when he apparently failed to fully recover from an attack of "influenza". A diagnosis of pulmonary tuberculosis was made that summer, and E. F. entered a sanatorium in October, 1939. The superintendent of this sanatorium reports his condition at that time as follows: "Involvement on admission was bilateral, with cavity in right upper. Sputum positive. He was evidently ill about six months before he was picked up."

Now let us consider the results of tuberculin testing in that school.

The results of the 1937 testing compared very closely to those of the 1933 survey. In 1940 the percent of positive reactors has almost quadrupled (7.9 to 28.4). However, the grades, 1 to 8 inclusive, show very little change in the percentage of positive reactors. The in-

	HIGH SCHOOL				GRADES				SUMMARY			
Year	No. Tested	Percent Tested	No. Positive	Percent Positive	No. Tested	Percent Tested	No. Positive	Percent Positive	No. Tested	Percent Tested	No. Positive	Percent Positive
1933									113		9	7.9
Fall, 1937	47	53.4	2	4.2	73	64.6	7	9.5	120	59.7	9	7.5
1940	82	82.	36	43.9	70		7	10.0	152		43	28.4

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*Read before the Lymanhurst Health Center Medical Staff, Minneapolis, April 22, 1941.

crease is entirely in the High School. I think we are justified in attributing most of that increase in positive reactors to the one open case that developed in their midst—and further figures seem to confirm this as a fact.

We should first note that young E. F. was in school when the 1937 survey was conducted, but did not avail himself of the opportunity. The percentage of pupils taking the test was, of course, very poor.

In 1940 we had at first only 50 per cent of the high school students taking the test, but the percentage of positives was discovered to be so high that a second survey was done in hopes of getting the rest of the high school tested. Even then, only 82 per cent took the test.

In studying the distribution of these 1940 positive reactors in the various classes of High School, we find the following interesting results:

1. E. F. was a member of the Class of 1939. This class had left school when the 1940 survey was made. All we know is that every one of these young people who went away to college and were tested there showed a positive reaction to tuberculin.

2. The members of the next classes were evidently closely associated with E. F. due to the small size of the school. The findings of these classes are as follows:

Class	No. Tested	No. Positive	Percent Positive	Remarks
1940	11	9	81.8	4 of the positives were negative in 1933, and negative in 1937. 4 were negative in 1933, and not tested in 1937. 1 never was tested before.
1941	14	10	71.4	3 of the positives were negative in 1937. The rest had never been tested before.
1942	27	15	55.5	8 of the positives were negative in 1937. 2 were positive in 1937. The rest had not been tested before.
1943	30	2	6.6	1 positive was negative in 1937. The others had never been tested before.
The next three grades	70	7	10.0	

The class of 1943 were in the 8th grade when E. F. was a senior, and most of these were then in rural schools. The low percent of positive reactors reflects that fact.

3. All the pupils coming to School A in the same bus as E. F. were found to be positive to tuberculin. Four of the ten positives in the lower grades were in this group.

Were it possible to have had compulsory testing—I cite this as one instance where widespread infection would have probably been avoided.

SCHOOL B

School B is a larger school with a high school enrollment of 325 and total enrollment of 800.

The results of three testing surveys in this school are as follows:

	HIGH SCHOOL				GRADES				SUMMARY			
Year	No. Tested	Percent Tested	No. Positive	Percent Positive	No. Tested	Percent Tested	No. Positive	Percent Positive	No. Tested	Percent Tested	No. Positive	Percent Positive
1933	252	87.5	22	8.7	430	91.5	25	5.8	682	89.7	47	6.8
1939									748		48	6.4
Feb., 1941	265	80.7	42	15.2	381	79.5	19	4.98	646	80.0	61	9.5

These results show no very spectacular rise in the percent of positive reactors in the High School. However, at the time of the reading of the tests, it was quite obvious that among the senior class there was an unusually high number of positive reactors, especially among the boys.

In checking this class separately and comparing it to the rest of the High School, we find:

The cause of the definitely higher percentage of positive reactors in the senior class, and especially among the senior boys was easily found. In the fall of 1940 one of the members of the class, D. C., a lad of 17,

	No. Tested	No. Positive	Percent Positive	Remarks
9th. 10th, 11th grades	185	15	8.1	Practically the same as 1933.
12th grade	80	27	33.75	17 of the positives were negative in 1939. 3 had been positive in 1939. The rest had not been tested before.
12th grade Boys	35	17	48.5	
12th grade Girls	45	10	22.2	

was found with active pulmonary tuberculosis. Unlike E. F., of School A, D. C. had availed himself of the testing opportunity offered to that school in 1939. He was found to have a positive reaction to 0.1 mgr. of O.T. He then had an X-ray of the lungs. The physician who read the X-ray advised recheck frequently because of large calcareous deposits in right lung. This was in March, 1939.

This advice was not followed. D. C., who was a fine athlete, played football in the fall of 1939 and basketball in the spring of 1940. He "kept in condition" by working on a farm during the summer of 1940. He played football again in the fall of 1940 (with no thought of recheck with X-ray). At the end of the football season, November, 1940, he consulted his physician because of loss of weight. X-ray at that time showed parenchymal infiltration in both apices, with annular shadow at right. Diagnosis was moderately advanced pulmonary tuberculosis with possible cavitation, right. Sputum, positive.

In checking the 1940 football team, we find: 1 active case (D. C.), 11 positive reactors, 10 negative reactors, 1 not tested, 1 had left school, or 12 positive reactors out of 22 tested, giving a percentage of positives of 54.5.

The advisability of testing all students who are to take part in strenuous competitive athletics and X-raying all positive reactors before each season cannot be overemphasized.

It is obvious that repeated X-ray of all positive reactors is important (whether they are athletes or not).

This fact is very clearly demonstrated by the findings in School C:

SCHOOL C

This Junior and Senior High School, of around 900 enrollment, has such an interesting history of testing surveys leading to the discovery of active cases of pulmonary tuberculosis among its students, that it deserves a special report of its own. We will just note that in the last three surveys conducted in this school, the policy has been not only to recommend X-ray to the newly found positive reactors, but to strongly advise rechecking the previously found positives.

Following the January, 1940, testing, 59 new positive reactors were X-rayed, and 74 positives of the November 1938 testing were re-rayed. Among those 74 were three cases of active pulmonary tuberculosis which would have been missed, at least for a time, had they not been urged to be rechecked.

All three were admitted to a sanatorium. The report we received from the superintendent on these cases is also of interest:

> Case 1.—"Admitted in April, 1940. Stage I case. No positive sputum. Discharged, March, 1941."
>
> Case 2.—"Admitted July, 1940. Classified Stage I case, but there was a suspicion of cavity on left. Pneumothorax, left, started. No positive sputum."
>
> Case 3.—"Admitted February, 1940. IIIC active, with bilateral cavitation. Sputum positive."

The results of the 1940 testing of their classmates are as follows:

The percent of positives in the 9th grade is not as high as one might expect since Case 3 evidently had positive sputum before leaving school. It is considerably higher, however, than the rest of the high school except that of Grade 11. The percentage of positives in Grade 11 certainly can not be attributed to Case 1 which was minimal with no positive sputum. Perhaps the explanation rests among those pupils who refused the test.

	No. Tested	No. Refusing Test	Percent Tested	Positive	Positive	Remarks
9th grade	177	15	92.1	35	19.7	Cases 2 and 3 were both in the 9th grade.
11th grade	148	6	96.1	26	17.5	Case 1 was in the 11th grade.
7th, 8th, 10th, 12th grades	530	74	87.7	29	5.4	

SCHOOL D

School D is a large Junior and Senior High School with an enrollment of around 1,000; Senior High School of 600. This school shows the result of the interest aroused in a whole community by the development of four cases of active tuberculosis among the high school students in as many months, with two deaths. This occurred in the school year 1933-34.

Case 1.—In early December, 1933, a high school girl developed what seemed to be "flu". During Christmas vacation she was found to have positive sputum and was admitted to a sanatorium.

Case 2.—A high school girl who had been losing weight rapidly, but because of an enlarged thyroid and hoarseness had been diagnosed as a toxic thyroid was found in January, 1934, to have a far advanced pulmonary tuberculosis, with involvement of the larynx. She left school the second week in January, 1934, and died at the University Hospital February 26, 1934.

Case 3.—Another high school girl operated on in March for appendicitis was found to have a tuberculous peritonitis. She died following the operation.

Case 4. On April 14, 1934, another high school girl had a pulmonary hemorrhage, and was diagnosed as pulmonary tuberculosis. Extent of disease not noted.

The latter part of April a tuberculin testing survey of the Junior and Senior High School was done. Eight hundred sixty-two students were tested, or 85 per cent of the enrollment. One hundred ninety-three positive reactors were found, or 22 per cent. The senior high had 25 per cent positive reactors. This did not seem high in view of the number of cases having developed in that school. But the size of the school accounted for this. In the home room group of the above cases we find:

Case 1.—28 per cent positive.

Case 2.—(far advanced when found) 63 per cent positive.

Case 4.—47 per cent positive.

The interest aroused in that community was such that a yearly survey of the school was started. The School Board showed their interest by appropriating the funds for the X-rays and have continued to do so since. The local physicians helped in offering the X-rays at a definitely reduced cost. Every year since, the test has been offered to the following groups:

1. The 7th grade. The new grade entering school.
2. Any new student in the other grades. There are always quite a few in the 9th grade.
3. Any who have previously refused the test.
4. The outgoing seniors are urged to be retested.
5. Any others who wish to be tested.

After three years of testing the school nurse figured that 95 per cent of the school enrollment had been tested at least once—many of them twice. This percentage has been maintained. Last year 100 per cent of the 8th grade had been tested.

The results of these tests have developed a very interesting trend.

Year	No. Tested	No. Positive	Percent Positive
1934	862	193	22.3
1935	263	40	15.2
1936	203	29	14.2
1937	205	24	11.6
1938	304	34	11.1
1939	310	31	9.9
1940	308	20	6.5

The trend downward is too steady not to be significant. Are we not justified in attributing some of this downward trend to the general interest in anti-tuberculosis work aroused by these yearly surveys?

CONCLUSION

The four schools reported above are only examples. Similar circumstances have been found in scores of schools in this state.

Active contagious tuberculosis does occur in high school students. Such cases undetected can cause widespread infection. Regular tuberculin testing surveys with periodic X-ray examination of all positive reactors have been found effective means of detecting such cases. This effectiveness would be increased if 100 per cent of the students could be tested.

THE JAPANESE death rate is 17.4 per 1,000 as compared to 10 or 11 in the United States. Japan's present death rate resembles ours of 1900. Individual causes of death in Japan are about as prevalent now as in this country about 1900. For example, the United States tuberculosis death rate now is 45 per 100,000. In Japan in 1937 the rate was 204, closely resembling our tuberculosis death rate in 1900 of 196. The picture is similar for diarrhea and enteritis. America has more than twice as many men to draw on in the military age group as Japan—25 million men from 20 to 34, as against Japan's 11 million in this age group.

Eleventh Annual Report
of the
Tuberculosis Committee, American Student Health Association
For the Academic Year 1940-1941*

As the First Report of the Tuberculosis Committee was a purely organizational document, this Eleventh Annual Report concludes a decade of effort that began with the college year of 1931-32. The phenomenal growth of the response throughout the country is apparent when we note that colleges with tuberculosis case finding have progressed from a scant half-dozen at the start to over three hundred at present. There has been no draft. All support has come through enlistment of the alert and the interested. However, there is plenty of room for volunteers left in the ranks of the forces fighting disease, misery and death. The health offensive must not bog down.

Whereas one year ago we found 248 colleges and universities able to report on a tuberculosis program of varying degree dependent on local conditions, for the academic year of 1940-41 the total swelled to 304. This 22.6 per cent increase is heartening to the Committee and to all friends of preventive medicine and public health, but the remaining 550 colleges on our mailing list challenge us to attack the problem unceasingly. The day must and surely will arrive when tuberculosis no longer can find, in the length and breadth of America, sanctuary in what we like to refer to as our "halls of learning." Our most pressing (and most difficult) task remains the education of the educators.

A reasonably safe wager would be that one could approach any college president in the United States, and, with a minimum of sales talk, sell him a fistful of Christmas Seals. The hitch comes when we try to sell many of these leaders the very program their own money has gone to support. It is to be feared that sometimes we contribute to worthy causes in order to be spared further thought about them or contact with their unpleasant realities. Too many college administrators, even in these enlightened days, refuse to admit the necessity for early diagnosis among their students, though they will give generously to an agency whose chief concern is early diagnosis for all who need it. Lacking medical training, laymen overlook the insidious onset, the prolonged presymptomatic phase of pulmonary tuberculosis, though they are well schooled in and show abundant respect for diseases that strike suddenly and dramatically. Failing to hear of acutely ill, consumptive cases or of actual fatalities on their campuses, they inform us blandly, and with evident sincerity, that *their* students, unlike other young Americans, are (presto!) entirely free from tuberculosis. Occasionally, one more naive or more direct than the rest, replies that at least he *knows* of no tuberculosis among those entrusted to his supervision. Some declare that lack of money is the deterrent, though investigation usually discloses lack of organization to be the fault, and generally discovers nearby public health agencies ready to help if allowed the opportunity.

Main finding of the Committee is that tuberculosis is being eliminated steadily from campuses wherever it is hunted and hounded constantly. Main duty of the Committee is to sponsor more and more education until all the uninformed are converted. Main hope of the Committee is to witness the eradication of tuberculosis from the entire population. And there seems no better place to begin than in our schools and colleges—the leaven in the lump.

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What does the Committee consider the best tuberculosis program for colleges? We recommend:

1. *The Tuberculin Test*: Only by use of the tuberculin test can we ascertain who are infected. X-ray surveys that omit the test will see their results brought into question through the inevitable inclusion of much that may appear suspicious on the films but is of non-tuberculous origin, while all chests that contain tuberculous lesions not demonstrable on standard postero-anterior views and any that harbor lesions too minute to be recognized macroscopically, will be passed by the roentgenologist as normal or "negative". Exclusion of the tuberculin test robs the community of its only sure means of finding and following the infection rate—a much more valuable index than the rates for morbidity or mortality, significant as these may be. Epidemiological considerations invariably demand inclusion of tuberculin testing.

(a) The Method: In spite of its bother we recommend the intradermal technic of Mantoux. Nothing has been advanced that promises or confers greater accuracy than the intracutaneous route of administration, whereby carefully measured quantities of the testing material are introduced into an area where they can produce no harm but where they are removed from artefactial influences. We feel that the Pirquet method is rather outmoded, while the patch test is merely a streamlined adaptation of the discarded Moro technic, open to a variety of mild criticisms outlined in our previous reports, and failing in the hands of many investigators to locate as many positive reactors as do the properly administered Mantoux tests. It is still undetermined how many of the unrecognized reactors bear concealed trouble that may prove clinically important.

(b) Frequency of Testing: Tuberculin surveys of all new students or employees and annual re-testing of all previously negative reactors should be the minimum procedure. In groups whose hazard of exposure is extraordinarily high, as among medical and nursing students, tests should be repeated as often as every three months, never less frequently than semi-annually. Individuals

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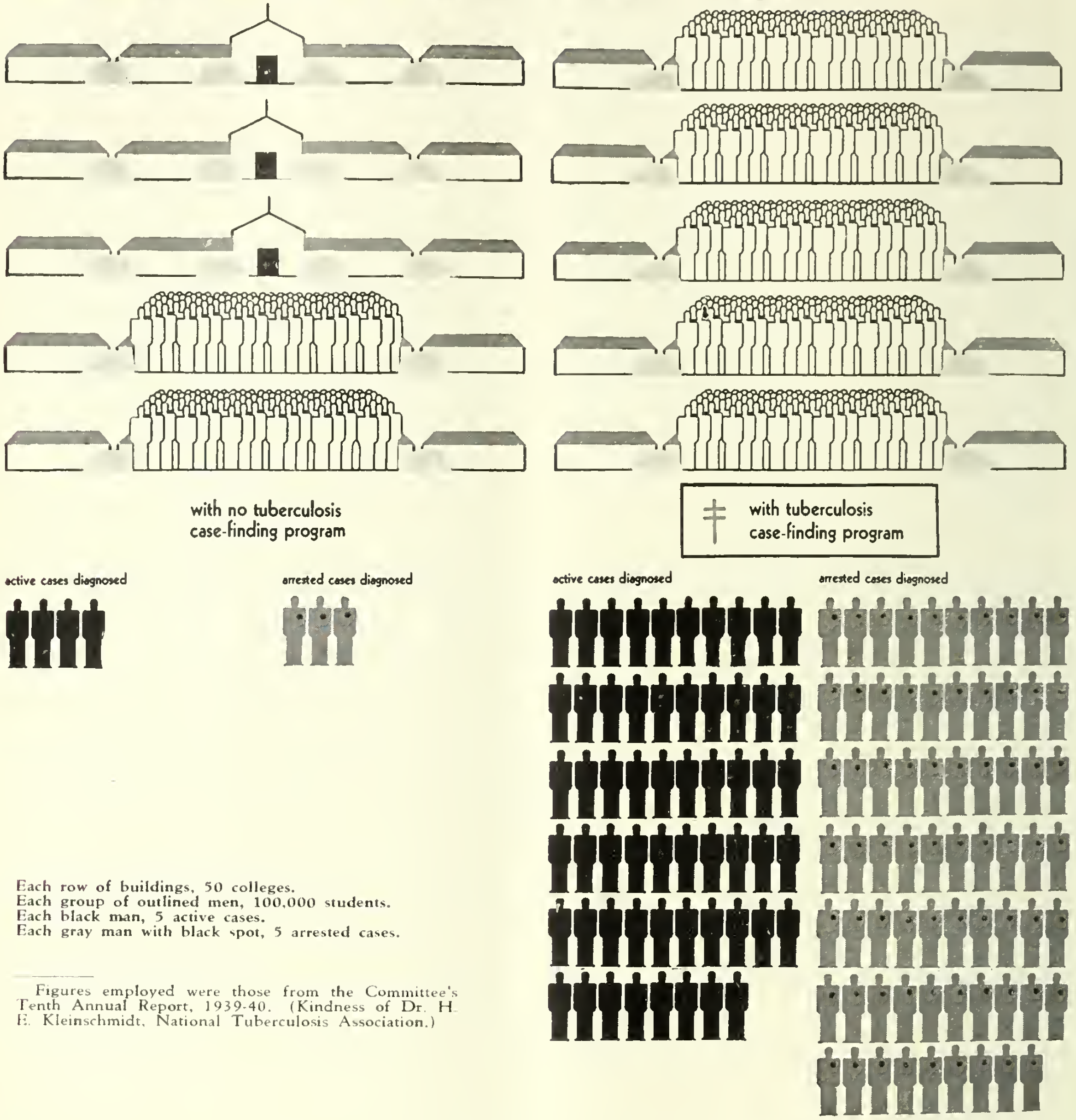
*Presented at the twenty-second annual meeting of the American Student Health Association, Hotel New Yorker, New York, N. Y., December 30-31, 1941.

Tuberculosis is Found When Looked For in American Colleges



Each row of buildings, 50 colleges.
Each group of outlined men, 100,000 students.
Each black man, 5 active cases.
Each gray man with black spot, 5 arrested cases.

Figures employed were those from the Committee's Tenth Annual Report, 1939-40. (Kindness of Dr. H. E. Kleinschmidt, National Tuberculosis Association.)

giving a definite history of recent exposure to open tuberculosis also need frequent scrutiny.

(c) The Product: For several years the Committee has recommended the use of the Purified Protein Derivative of tuberculin, regarding it as somewhat more specific and less liable to false reactions. However, we have stated annually that any good, reliable brand of Old Tuberculin will give excellent results, if freshly mixed and properly employed. We have gone so far as to suggest the product supplied by the Saranac Laboratories, Saranac Lake, New York, as an example of a carefully standardized material. The better pharmaceutical houses sell potent, accurately controlled tuberculin, as well. P.P.D. is the more expensive, but obviously worth more. It is hazardous, and inviting disappointment, to begin large scale testing without first checking the tuberculin by administering a test dose to a known positive reactor.

P.P.D. is supplied in first- and second-strength doses of standard specifications, ready to mix in an accompanying sterile diluent. Where O.T. is used, we recommend a first test of optional size, either 0.01 or 0.1 mg., but the second dose for those not reacting to the first invariably should reach 1.0 mg. In any case, the volume of solution introduced between the skin layers should not exceed one-tenth cubic centimeter.

(d) The Dosage: The Committee has not forsaken its stand for a two-dose Mantoux test. Expediency may tempt some to experiment with a single small, an intermediately-sized or a solitary large dose, in order to save time or money for the institution or to coax reluctant students to coöperate. Until research indicates a safe and reliable single-dose method, however, we reiterate that the primary minute dose is necessary to protect the hypersensitive against severe reactions, while the greatly multiplied second dose is essential if we are to identify those truly positive tuberculin reactors whose degree of skin allergy is low. Again and again it has been shown that many of the preclinical, minimal cases of the type we aim to diagnose in college students are located only by the larger dose, and would go unsuspected were we to confine our dosage to an inadequate level.

(e) The Set-up: Using standard tuberculin syringes, graduated in hundredths of a cubic centimeter, it is best to employ platinum-iridium needles of the Schick test type, that may be flamed handily between tests. With a marshal or two to check the roll and supervise the line, an assistant to sterilize the skin of the forearm, and a clerk to record, a physician can administer rather easily tests to three or four individuals per minute in a suitable hall, provided the students have been mobilized for the purpose, understand and approve of the procedure. Others may prefer to test small groups or may find it advantageous to conduct their program on an individual basis. The mass survey conserves time, money and energy, concludes the examination early, and establishes the status of everyone on the campus so far as communicable tuberculosis is concerned before harm can accrue.

2. *X-rays of the Lungs*: The Committee insists that it considers the search for a positive tuberculin reaction without provision for a subsequent chest X-ray to represent unintelligent medicine and waste motion, just as it believes mass X-raying without prior tuberculin tests deprives the college health officer of knowing exactly who and how many of the students and staff are infected with viable tubercle bacilli. However, be the *ideal* program what it may, the circumstances of the moment and the local situation will continue to dictate each institution's set-up for tuberculosis control.

(a) The Frequency of Filming: The Committee recommends that all positive reactors be required to have a chest X-ray at once, repeated at least annually, or oftener where there are findings to suggest its need. Medical authors for years have been emphasizing, student health workers corroborating the fact that presymptomatic pulmonary tuberculosis rarely can be suspected and never can be proved without a satisfactory roentgenogram of the lungs. This should be pondered by all college authorities still content to rely on outside certification, history of contact or of suspicious symptoms, or stethoscopic examination alone as the means of finding the disease among their students.

(b) The Method: Here, again, circumstances will determine the procedure. Stereoscopic celluloid films 14 x 17 inches, are prohibitive in cost, and are better reserved for detailed study of suspicious findings in selected cases than used routinely. Full-size single celluloid films are about the best filming medium now available to most colleges. Very excellent results, too, have been obtained by the use of the fine quality paper films now provided by the manufacturers. Mobile units, within areas close to metropolitan centers, are able to X-ray large numbers of students speedily and accurately on campuses where X-ray facilities are lacking or sub-standard, and are able to do so at a very reasonable cost.

Great impetus has been lent to the use of photofluorography by its employment in mass surveys both in civilian and military populations. Of these methods, most reports seem to indicate that the 4 x 5 inch reproduction of the fluoroscopic lung image is superior in detail to that obtained with 35 mm. pictures, which must be magnified during interpretation. Unfortunate elimination of the tuberculin test as a preliminary screen, the undeniable limitations imposed by the reduced size of the picture that must contain all vital details of the lung structures, the original cost of the device, and, for some time to come, the impossibility of securing new machines are current drawbacks to the new medium. Undoubtedly the method is economical, rapid and valuable, here to stay, and promises greater contribution to public health protection as technical flaws are corrected.

The Committee does not advocate the sole use of the fluoroscope as a substitute for films. Even an excellent fluoroscope may fail to reveal some minimal lesions to examiners not specially trained in its use, while the lack of permanent records for later comparison or consultation is an easily apparent fault. As in past communications, we urge that the fluoroscope be used as widely as possible, but always as an adjunct to the best available filming methods. The ingenious "spot films" of ordinarily inaccessible lesion shadows begun by Stiehm will undoubtedly be developed further by other investigators.

3. *Clinical and Laboratory Methods*: Students in whom lesions of clinical significance are suspected will require sufficient close study to determine their true status both for their own benefit and for the protection of their daily associates. It is unnecessary to do more than list some of these investigative measures, such as careful observation of temperature, pulse and respiratory rate. We believe that this is best carried out with the student confined to bed in the infirmary for two or three days. Temperature determination should be of the five-minute variety, with the nurse constantly present. The weight should be followed and recorded, though, in preclinical cases, it seldom provides much of a clue.

Laboratory examinations will include securing a complete blood study, with counts of the red cells, white cells and differentially of the leucocytes, as well as hemoglobin assays and a measurement of the rate of erythrocyte sedimentation. We have found that the last-named procedure is disappointing in the very early cases, usually giving a normal reading. Calculations of Medlar's index may prove helpful. Serological tests have been advocated by some, but are not in widespread use.

Sputum is seldom obtainable in the type of case we discover in colleges. Where present, it should be examined in every indicated manner. Most important is to secure fasting gastric contents on repeated occasions for smear, culture and animal inoculations. More and more evidence accumulates, in student health practice and elsewhere, to prove that tubercle bacilli can be recovered from a large percentage of negative-sputum or sputumless cases of early pulmonary tuberculosis if the gastric residue is examined. Stiehm believed that this procedure was destined to go linked with serial roentgenograms as a reliable index of the progressive nature of a lesion under suspicion.

4. *Scope of the Program*: (a) The Student Body: First, the case finding should include every student. Voluntary response may represent the highest ideal of educational and democratic achievement, but, in public health endeavor, where the safety of all may be menaced by the negligence of a few, colleges have as much right and reason to insist that every student submit to the tuberculosis survey as to impose any number of other accepted academic requirements. Most colleges publish that they demand a complete physical examination of all their students. In the light of present knowledge and current medical standards, such schools should refrain from use of the word "complete" unless a search for tuberculosis by modern methods is included. Otherwise the claim is a mockery.

(b) The Faculty and Employees: Ironically, it proves much more difficult to secure whole-hearted faculty participation in the plan than to require it of the rank-and-file. A conscientious college president scarcely will contract with a teacher to present his subject to the students unless he has become convinced that the training, talents, personality and morals of the instructor make him suitable to be among young people. What excuse can there be for turning loose on a campus estimable teachers who may be the unwitting spreaders of a disease such as tuberculosis, known to be the leading health threat and cause of death in the youth of both sexes? Many colleges now require examination of teachers, and, where this has been inaugurated, the anticipated revolt has failed to materialize. Instead, the faculty members, displaying intelligent coöperation, seem to realize the happy effect of their example, and to appreciate the measure of protection afforded their own health and future.

Whatever the progress of the campaign to interest and win the faculty, certain it is that the colleges must demand complete examination of all their employees who handle food, water, ice, linen, or work in close contact with students. As an educational project or as a medical venture, to examine the student body in exhaustive detail and then to expose it to a questionable campus health environment seems utterly nonsensical and incompatible.

(c) Action Based on Findings: The Committee already has outlined what should be done with the positive or the negative tuberculin reactor. When X-ray evidence of pulmonary infiltration has led to clinical establishment that an open or progressive lesion exists, it becomes the duty of the college health officer to act in the interests of everyone. Except in carefully selected cases in institutions equipped to provide maximum follow-up, pathologically active cases should be advised to seek immediate care, preferably in a good sanatorium initially, until they are educated to look after themselves and the status of their disease has been satisfactorily determined. Even in colleges or universities where an occasional exception may be possible for selected (perhaps pneumothorax) cases, the patient must room alone, should be excused from all required physical education, barred from competitive athletics, and kept under constant scrutiny.

Students whose lesions are demonstrable, but are judged arrested or probably arrested, should be made to secure more rest than their friends, should be prevented from undertaking too ambitious a program of study, outside work or extra-curricular activity. Here, too, frequent follow-up is a necessity.

The fullest possible coöperation with public health and tuberculosis organizations in the home communities from which infected students originate is to be stressed. Thus, very often, unsuspected sources of infection are found and eliminated. A common-sense appeal to the relatives and to the family doctor is necessary, and a forthright explanation of the situation goes far to allay unnecessary alarm. Fortunately, most people nowadays know enough about tuberculosis and its control and prevention that parents are quick to understand and appreciate the protection being thrown around their children in progressive colleges. Increasingly, parents show themselves reluctant to enter their sons and daughters in colleges lacking a comprehensive health program. Colleges neglecting health coverage, no matter what the excuse, are rapidly becoming anachronisms in American education.

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The manner of preparation of this Report may be of interest:

The chairman addresses a letter to college presidents each Spring. This is zincographed at National Tuberculosis Association headquarters, and, accompanied by duplicate copies of the annual questionnaire and a self-addressed, postage-guaranteed envelope, goes forward to every institution of higher education in the United States and Canada on or about May 1. The questions are so worded and so marked as to convey the Committee's recommendations of an optimum program. The colleges are invited to supply us with information, retaining one copy of the blank for their own files. This appeal for data usually results in returns from roughly one-half of those eventually replying. It gives opportunity for considerable work to be done on the returns during the slacker Summer months.

A second letter, more urgently phrased, with another set of blanks, is sent out to colleges thus far silent on October 1, and brings in a flood of replies from those who could not or did not answer earlier. The list is closed early in December, and the detailed analysis of the data is begun by statisticians under the capable direction of Miss Marion Nelson, of the National Tuberculosis Association.

Tabulations, except for the inevitable late arrivals, reach the chairman shortly before Christmas, after which final analysis takes place and the text of the Report is written. A preliminary summary is mimeographed for distribution at the Committee's luncheon during the American Student Health Association's meeting, while the entire Report is published in the Proceedings of the Association early in the New Year and in the official publication, the *Journal-Lancet,* the following April.

In addition to providing the tremendous assistance its statistical staff gives this Committee, the National Tuberculosis Association supports us financially to the extent of paying for our printing, mimeographing, all postage connected with the questionnaires, and a small grant whenever the chairman must secure extra clerical help. Between one and two thousand reprint copies of the Report are purchased by the National Tuberculosis Association and dispatched to every college and university, as well as to all State and many local Tuberculosis Associations. Non-responding colleges are pricked into action by local pressure and offers of local assistance from the nearest and most active tuberculosis agency, the latter having been notified of the dormant schools by Miss Louise Strachan. Working with her and employing the other members of the Committee geographically, the chairman is able to write to a large number of inquiring colleges and supply the information or advice their officials seek.

Copies of all prospective literature in the annual campaign are tendered to the entire Committee membership for criticism and suggestion, while the members are polled each year before the chairman takes the responsibility for writing those portions of the Report that deal with what should be and, in fact, are the unanimous recommendations of the Committee.

At this point the chairman desires to thank his colleagues, both active and advisory, for their unfailing support, and to express for all of us the sincere appreciation we cherish for all that Dr. Kendall Emerson and his staff have done and will do to make our work succeed. Several State Tuberculosis Associations have won our admiration and deserve our thanks for the way they have made productive personal visits upon college executives to whom we, at best, could only write. In particular do we thank every college representative who participated in this round-up of information so vital to all of us.

Another activity of the Committee that has become an important fraction of the whole program is the College Hygiene luncheon, held annually during the meeting of the National Tuberculosis Association. At the San Antonio sessions last May, a stimulating address was delivered on the subject of student tuberculosis by Dr. Horton Casparis, Professor of Pediatrics at Vanderbilt University. It was the eighth such luncheon and, as usual, attracted a large attendance.

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Collection, analysis and presentation of data concerning the results of student tuberculosis control are among the functions of the Committee.

In previous Reports we have cautioned against anyone's accepting our statistics, derived from so many variable sources, as rigidly accurate in the mass. We believe they are reasonably correct, however, especially since the adoption of the simplified questionnaire form now in use, the preservation of adequate and uniform records by most of the coöperating colleges, and the fact that many of the schools possess programs that have operated past the experimental stage for a considerable time. The sampling is wider and fairer each year, and, with a few necessary reservations, the figures tend to mean more and more in evaluating the worth of various procedures and the results obtained through them.

The tables of this Eleventh Report are modeled on those of earlier presentations, and call for little elaboration or explanation. We draw attention chiefly to the fact that most of them reveal movements toward stronger programs, sounder methods, with consequently gratifying results. Stressing that trends are indicated rather than absolute facts claimed, we believe the following highlights are worthy of note:

Table I: No mushroom growth is here, but a tripling of colleges with definite case finding in the last five years is both satisfying as to past success and stimulating toward future advances.

TABLE I.

Colleges and Universities with Tuberculosis Case Finding, 1931-1941

Year:	Number Reporting Tuberculin Testing	Number Reporting Some Tuberculosis Program
1931 - 32	6-10 (Est.)	
1932 - 33	12	
1933 - 34	38	
1934 - 35	42	
1935 - 36	28 (x)	
1936 - 37	91	104
1937 - 38	116	133
1938 - 39	143	165
1939 - 40	213	248
1940 - 41	255	304

(x) Incomplete returns.

Table II: Only one State remains entirely devoid of student tuberculosis control. One year ago there were six States in that category. Additional colleges were recruited from every area except the Middle Atlantic States, greatest numerical increase being in the Midwest, with 29 colleges added in the year, while the largest relative increase was shown in the Pacific Coast region, where the honor roll contains 57 per cent more names than at the last Report.

Tables III and IV: Eight more colleges replied to our questionnaire this Autumn than ever before, and, although this is a minute improvement, the percentage of correspondents able to report programs in operation climbed in twelve months from 52 per cent to 63 per cent of the total replies—surely no trifling gain! Notable, however, is the fact that the poorest relative showing continues among the smaller schools, usually those privately endowed. Such institutions need aid from many directions, and it is here that local tuberculosis associations can best supply leadership and, in many cases, the

TABLE II.

Questionnaire Survey of Tuberculosis Case Finding in American Colleges and Universities, 1940-41

	Blanks Sent	Replies Received	TB Programs Reported
Canada	21	6	6
Total	21	6	6
Maine	7	4	3
New Hampshire	6	2	2
Vermont	6	1	1
Massachusetts	39	27	22
Rhode Island	4	3	3
Connecticut	12	7	6
Total	74	44	37
New York	50	29	19
Pennsylvania	63	27	20
New Jersey	18	12	10
Delaware	1	1	0
Maryland	17	11	4
District of Columbia	10	4	1
Total	159	84	54
Virginia	18	13	7
North Carolina	22	11	5
South Carolina	15	7	5
Georgia	15	5	4
Florida	7	3	3
Total	77	39	24
Oklahoma	16	8	4
Arkansas	11	6	1
Tennessee	26	5	1
Mississippi	10	7	5
Alabama	13	7	2
Louisiana	11	2	1
Texas	32	14	2
Total	119	49	16
North Dakota	9	5	5
South Dakota	8	5	3
Minnesota	21	14	13
Wisconsin	24	20	15
Michigan	24	17	13
Ohio	48	34	18
West Virginia	14	9	8
Indiana	26	22	12
Illinois	44	24	14
Iowa	25	10	3
Nebraska	16	11	5
Kansas	21	15	13
Missouri	21	20	5
Kentucky	16	7	4
Total	317	213	131
Montana	6	2	2
Idaho	3	2	1
Wyoming	1	1	1
Nevada	1	1	1
Utah	4	1	1
Colorado	9	5	3
Arizona	3	3	3
New Mexico	4	2	2
Total	31	17	14
Washington	14	7	6
Oregon	10	7	3
California	32	17	13
Total	56	31	22
Grand Total	854	483	304
Previous Year	877	475	248
Two Years Ago	857	282	165
Three Years Ago	852	238	133
Four Years Ago	819	233	104

TABLE III.

Enrollment of Institutions Cooperating in Tuberculosis Survey

Enrollment:	Number of Schools 1939-40	Number of Schools 1940-41
Less than 500 students	175	180
500 to 999 students	129	123
1,000 to 1,999 students	58	71
2,000 to 2,999 students	29	29
3,000 to 3,999 students	17	12
4,000 to 4,999 students	6	7
5,000 students and over	34	34
Enrollment not given or listed	27	27
Total schools	475	483
Total student enrollment (where reported)	680,201	689,783

TABLE IV.

Tuberculosis Case Finding as Reported in Various Classes of Institutions of Higher Education

Type of School:	Schools with NO TB. Program, 1940-41	Schools with SOME TB. Program, 1940-41
Private Endowed Colleges	131	118
Endowed Universities	6	35
State or Provincial Universities	5	36
State Colleges and Institutes	9	35
State Normal and Teacher's Colleges	22	70
Civic Colleges and Universities	6	10
Total Reporting, 1940-41	179	304

TABLE V.

Details of Tuberculin Testing in Various Institutions

	1939-40	1940-41
Number of Colleges Reporting Some Tuberculin Testing in Progress	213	255
Method Employed:		
Mantoux Intradermal Technic	182*	198
Von Pirquet Cutaneous Technic	6	4
Vollmer Patch Test Technic	11*	32
Combined Patch and Mantoux	4	12
Not Specified	11	9
Type of Tuberculin Used:		
Purified Protein Derivative	90*	118
Old Tuberculin	84	97
Miscellaneous Combinations	40*	40
Number and Strength of Test Doses:		
P.P.D. up to 0.005 mg., or O.T. up to 1.0 mg.	103*	122
P.P.D. not over 0.00002 mg., or O.T. not over 0.1 mg.	49	41
Various Intermediate-sized Doses	14	38
Miscellaneous	48*	54
Groups Subjected to Tests:		
a. Students:		
New Students only	28	56
Annual Re-test for Negative Reactors	57	64
New Students, with Re-test for Seniors	27	34
Any Student, Entirely Voluntary	40	65
First Test Required, Subsequent Tests Voluntary	32†	17†
Special Groups only (Nursing, Medical, Dormitory, Teaching Students, etc.)	8	5
Not Specified	21	14
b. Non-Students:		
College Food Handlers (Mostly Required)	66	108
Faculty, Administrative Personnel (Mostly Voluntary)	54	92
Other Employees (Mostly Voluntary)	—‡	54

*One college used patch test for males, Mantoux for females.
†Some of these schools require re-testing in Junior or Senior year.
‡Figures not kept separately prior to 1940-41.

badly needed financial help necessary to get the work under way.

Table V: The number of schools basing their case finding on tuberculin screening grows encouragingly, though as much cannot be said for the standard of procedures displayed generally. The Mantoux technic and employment of P.P.D. remain at the heads of their respective categories, but the Committee frankly regrets that so many colleges have begun with or reverted to what we have shown repeatedly is inadequate dosage if we aim at finding most of the positive reactors. Disappointing, too, is the suggestion that a sizeable group tests its students once only. On the credit size is the excellent coverage currently being extended to the faculty, food handlers and other college employees in about 100 schools. This is further emphasized in the analysis of X-ray procedures.

Table VI: Part 1 of this table can be dismissed with

TABLE VI.

Details of Chest X-ray Procedure at Various Institutions

	1939-40	1940-41
1. Schools with Tuberculin Testing	213	255
X-ray Positive Reactors ONCE, with Follow-up "When Indicated"	56	97
X-ray Positive Reactors ANNUALLY or Oftener	68	70
X-ray Once; RE-RAY SENIORS	1	3
X-ray is Voluntary, ACCEPTANCE GENERAL	45	46
X-ray is Voluntary, ACCEPTANCE NOT SATISFACTORY	10	12
Not Specified	20	20
Fluoroscope:		
a. Used Exclusively, Film only "When Indicated"	13	7
b. Used Supplementary to Films	42	45
2. Tuberculin Testing Waived for Special Groups:		
Routine Chest Films for Faculty	1	23
Routine Chest Films for Food Handlers	5	40
Routine Chest Films for Other Employees	—*	30
3. Schools without Routine Tuberculin Testing	35	49
Routine Chest Films for Students	32	45
Routine Fluoroscopics for Students	3	4

*Figures not kept separately prior to 1940-41.

the statement that X-ray follow-up of positive reactors is more comprehensive and closer to the ideal than ever in the past. Part 2 reveals an almost unbelievable improvement in roentgenological diagnostic scrutiny of faculty members and other institutional personnel. Part 3 finds a somewhat larger number of colleges than last year X-raying students without previously locating the infected by means of tuberculin tests. Although the Committee reiterates that this is not the optimum approach, it must have been found practical at the colleges now making it their chief weapon. Used with full realization of its clinical limitations, it can be a valuable aid. We are delighted to note how many schools now use the fluoroscope as a source of information to reinforce the permanent film record, while a gratifyingly small number depends exclusively on fluoroscopic visualization.

Table VII: Various factors combined to produce the drop in the percentage of positive reactors nationally this year. Of the 255 colleges reporting tuberculin testing in progress, it was necessary to exclude the returns of 38 schools, due to their being incomplete or faulty in some respect. Even so, the remaining figures betray the unmistakable dilution effect inevitable when we are forced to include returns based on inadequate Mantoux dosage, patch test results, and experiments now popular with regard to intermediately-sized doses of tuberculin. A definite improvement, of course, has been evident annually for some years, and a further valid influence this year has been the much larger total of Midwestern colleges reporting from an area where positive reactors quite often run as low as 10 to 15 per cent of those tested. That a real rather than a fancied improvement has occurred, however, is shown by the fact that were we to present only those returns from schools using a strictly "adequate" dosage, the figure for positive reactors in 1940-41 would be between 21 and 22 per cent nationally.

TABLE VII.

Tuberculin Testing of American College Students, 1932 to 1941, Inclusive

Year	Total No. Tested†	Pct. Positive	Pct. Men Positive	Pct. Women Positive
1932 - 33	14,318	35.0	35.0	27.0
1933 - 34	25,184	30.3	30.0	26.0
1934 - 35	26,861	29.4	30.0	27.8
1935 - 36	31,601	30.0	31.0	28.0
1936 - 37	56,224	27.3	29.4	24.8
1937 - 38	64,232	25.8	29.8	23.5
1938 - 39	82,774	25.5	27.0	24.3
1939 - 40	123,389	25.4	26.5	22.0
1940 - 41	149,744‡	20.7	22.8	18.5

†In their returns, some colleges fail to differentiate their reactors by sex, so that the total number tested is annually slightly in excess of the sum of those reported according to sex.

‡Dosage is unquestionably inadequate in many surveys reported.

It will be interesting to observe what further improvement appears in subsequent Reports, provided the elimination of tuberculosis from the entire population comes closer to realization. The "accrediting" plan so successful in the veterinarian campaign that has seen the disease eradicated from America's dairy herds is now being applied in Minnesota to the control of human tuberculosis on the county unit. It may well develop that such a plan of recognition could be inaugurated in our own Association on a modified scale with the individual campus as a unit.

Table VIII. Previous Reports have rendered so well known the difference in results achieved by colleges with and those without organized case finding that it seems unnecessary to do more than urge every reader to examine, once again, the contrasting stories of *tuberculosis found* by those who insist on searching for it in its early, symptomless and curable stages, and of *tuberculosis missed* wherever the authorities do nothing about it or, at best, swing into action only when late symptoms drive the student to seek a diagnosis and disaster is well established. Among any given student body, new cases of

TABLE VIII.

New Cases of Pulmonary Tuberculosis Diagnosed Among College Students, 1939-41

A. In Institutions with SOME Organized Tuberculosis Program:	1939-40		1940-41	
No. of Clinically Active§ Cases Diagnosed	292		343	
No. of Apparently Arrested§ Cases Diagnosed	345		623	
Total NEW cases Reported		637		966¶
No. of Students Who Left College Because of Tuberculosis	273		309	
No. of Institutions Reporting	248		304	
Approximate Total Enrollment	490,000		545,000	

B. In Institutions with NO Organized Tuberculosis Program:	1939-40		1940-41	
No. of Clinically Active§ Cases Diagnosed	21		14	
No. of Apparently Arrested§ Cases Diagnosed	14		19	
Total NEW Cases Reported		35		33¶
No. of Students Who Left College Because of Tuberculosis	25		18	
No. of Institutions Reporting	227		179	
Approximate Total Enrollment	200,000		145,000	

§Generally recognized criteria of activity were specified.

¶Colleges with programs had back in school under close observation 462 additional OLD cases, while colleges without programs knew of 17 similar cases among their students.

pulmonary tuberculosis were discovered eight times as frequently where a formal program existed in 1940-41 as where none had been set up. This is practically the identical ratio of recent years, but it could be made much more startling were we able to find out what is being overlooked in the colleges that do not reply to our letters.

It is encouraging, also, to note in table VIII how many of the cases found withdrew from college at once, most of them, incidentally, to begin their cure and rehabilitation in good sanatoria. Significant is the fact that the vast majority of these newly diagnosed victims came to know of their trouble at a time when they could do themselves the most good and their associates the least harm.

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The following excerpts from a letter from the War Department are in reply to a plea by this Committee that every precaution be taken by the Government to avoid the mistakes and the disasters of the last World War with respect to tuberculosis in the armed forces of the United States:

> "The Surgeon General concurs in your recommendations unreservedly. It is the established policy of the War Department to have a chest X-ray included in the examination of every individual prior to acceptance for military service and at the time of his discharge as far as local roentgenological facilities will permit. To this end Army examining boards have been instructed to make use of every facility, not only of the Army but also roentgenological laboratories of health departments, civilian hospitals, physicians and commercial X-ray firms. Government funds have been provided to cover the cost of non-military X-ray service.
>
> "X-ray equipment has been ordered to supply all Army examining stations. Much of it has already been installed and is now in use. Until the rest is delivered by the manufacturers, full use will continue to be made of civilian facilities for making chest X-rays on men being examined for military service."

We are indeed glad to learn of the safeguards the Army, Navy and their various branches are establishing to eliminate tuberculosis from among enlisted and drafted men, especially when we recall that the tuberculous veterans of World War I have cost this country well in excess of a billion dollars to date, with expenditures continuing at the rate of about $3,000,000 monthly. The misery and suffering of the sick and the effect upon their families have not been calculated.

That students entering the Services can expect precautions comparable to those that have been maintained in college is encouraging. It should also be food for thought for those in charge of colleges who have hesitated to carry on upon their campuses what the Government now demands for all its soldiers and sailors.

We have one further hope, namely that the Government may soon avail itself of the vast amount of carefully amassed health data that progressive colleges possess with regard to individual students. Obviously, the Government must insist on uniform methods, unbiased opinions. Up to the date of writing, however, duplication of effort continues and too little utilization has been made of the important contribution the nation's student health services are fitted and prepared to make toward national defense and the conservation of precious time, money, materials and health.

Enemies of the United States are not all of the human variety. Total defense presupposes prevention of illness and disability so far as possible, early discovery and correction of remediable physical defects. A sick American is a weak American, and the war will not be won by a weak America. Avoidable illness costs money, hampers productivity, usurps facilities reserved for the unavoidable emergencies of wartime. Microbes may prove to be our deadliest Fifth Column.

Aliens who strike at dawn without warning, killing and maiming our young men, are no more successful in their onslaught than tubercle bacilli that strike youth insidiously at the first flush of adult life. Nor is it any more permissible for those who direct the destinies of college students to be blind and deaf to repeated warnings of the menace that wounds and slays than it would be for a commander to awaken to danger only after the foe had delivered a damaging blow.

Tuberculosis is the enemy of every American so long as tuberculosis exists in any American. Our job is to find the enemy and destroy him.

Death to—not from, tuberculosis, becomes our watchword!

Respectfully submitted for the
Tuberculosis Committee,

CHARLES E. LYGHT, M.D., *Chairman*,
Carleton College,
Northfield, Minnesota.

December 30, 1941.

THE TUBERCULOSIS COMMITTEE:

RUBY CUNNINGHAM, M.D.,
University of California,
Berkeley, California.

H. D. CRAMER, M.D.,
University of Idaho,
Moscow, Idaho.

H. D. LEES, M.D.,
University of Pennsylvania,
Philadelphia, Pennsylvania.

J. A. MYERS, M.D.,
University of Minnesota,
Minneapolis, Minnesota.

*R. H. STIEHM, M.D.,
University of Wisconsin,
Madison, Wisconsin.

C. E. LYGHT, M.D., *Chairman*,
Carleton College,
Northfield, Minnesota.

Advisory Members:

J. B. Amberson, Jr., M.D.,
Bellevue Hospital,
New York, N. Y.

H. E. Kleinschmidt, M.D.,
National Tuberculosis Association,
New York, N. Y.

F. M. McPhedran, M.D.,
Germantown Hospital,
Germantown, Pennsylvania.

H. D. Chadwick, M.D.,
Middlesex County Sanatorium,
Waltham, Massachusetts.

E. R. Long, M.D.,
Henry Phipps Institute, University of Pennsylvania,
Philadelphia, Pennsylvania.

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* Deceased.

Bibliography

Alt, H. L., et al: Tuberculosis in Medical Students, Am. Rev. Tuberc. 44:346 (Sept.) 1941.

Auerbach, O.: Tuberculosis in the Adolescent, Am. J. M. Sc. 201:60 (Jan.) 1941.

Bloch, R. G.: Case-Finding in Tuberculosis, Am. Rev. Tuberc. 43:213 (Feb.) 1941.

Crimm, P. D., et al: Patch and P.P.D. Tests and X-ray Correlation, Am. Rev. Tuberc. 43:799 (June) 1941.

Douglas, B. H., and Birkelo, C. C.: The Miniature X-ray Film of the Chest, Am. Rev. Tuberc. 43:108 (Jan.) 1941.

Edwards, H. R., et al: Examinations for Tuberculosis, J.A.M.A. 117:40 (July 5) 1941.

Feldman, F. M., et al: The Vollmer Patch Test and the Mantoux Test, Minnesota Med. 24:76 (Feb.) 1941.

Floyd, C., and Friedman, E.: Gastric Contents in Tuberculous Children, Am. Rev. Tuberc. 43:438 (March) 1941.

Hahn, R. G., et al: Pulmonary Tuberculosis in Medical Students and Nurses, Am. Rev. Tuberc. 43:600 (May) 1941.

Israel, H. L., et al: Tuberculosis Among Students of Nursing, J.A.M.A. 117:839 (Sept. 6) 1941.

Israel, H. L., and Hetherington, H. W.: Accuracy of Fluoroscopy in the Detection of Pulmonary Tuberculosis, Am. J. Med. Sc. 201:224 (Feb.) 1941.

Israel, H. L., and Long, E. R.: Primary Tuberculosis in Adolescents and Young Adults, Am. Rev. Tuberc. 43:42 (Jan.) 1941.

Jaffin, A. E.: Tuberculosis Case Finding, J. M. Soc. New Jersey 38:33 (Jan.) 1941.

Kereszturi, Camille: Present Status of the Tuberculin Patch Test, Am. Rev. Tuberc. 44:94 (July) 1941.

Long, E. R.: Tuberculosis in Military Service, J.A.M.A. 117:264 (July 26) 1941.

Myers, J. A.: Tuberculosis in Students, Amer. Rev. Tuberc. 43:235 (Feb.) 1941, and Ibid. 44:479 (Oct.) 1941.

Myers, J. A., et al: Tuberculosis Among Students and Graduates of Medicine, Ann. Int. Med. 14:1575 (March) 1941.

Plunkett, R. E., et al: Comparative Value of Roentgen-Photographic Methods, Am. J. Pub. Health 31:772 (Aug.) 1941.

Pollak, B. S., and Cohen, S.: Tuberculosis Among Student Nurses, Journal-Lancet 61:111 (April) 1941.

Post, J. W.: Evaluation of Paper Films in Mass X-ray Surveys, Dis. of Chest 7:328 (Oct.) 1941.

Report on the Examination of Teachers for Tuberculosis, School & Society 54:494 (Nov.) 1941.

Roper, W. H., and Ordway, W. H.: Gastric Lavage in Adults with Pulmonary Tuberculosis, Am. Rev. Tuberc. 43:543 (April) 1941.

Stiehm, R. H.: The Advantages of Roentgenoscopy and Roentgenoscopic "Spot" Roentgenograms in the Diagnosis of Early Pulmonary Tuberculosis, Am. J. Roentgenol. 45:871 (June) 1941.

Tenth Annual Report of the Tuberculosis Committee, American Student Health Association, Journal-Lancet 61:115 (April) 1941.

VACCINATION AGAINST TYPHUS FEVER, CHOLERA AND PLAGUE

Vaccination against typhus fever, cholera and plague of all U. S. military personnel stationed in or traveling through areas where they would be under serious threat of exposure to these diseases, was recently ordered by the Office of the Surgeon General, U. S. Army, Washington, D. C. The following instructions cover vaccinations:

1. Typhus Fever: The present approved vaccine consists of a suspension of killed, louse-borne, epidemic typhus rickettsiae prepared by the Cox yolk-sac cultured method and obtainable in 20 cc. vials through regular Medical Department supply channels.

Initial vaccination will consist of three injections of vaccine, 1 cc. each, administered subcutaneously, with intervals of from seven to ten days between injections. A stimulating dose of 1 cc. will be administered every four to six months as long as serious danger of infection is present, or whenever in the opinion of the surgeon this additional stimulation of immunity is indicated.

2. Cholera: The present approved vaccine consists of a suspension of 8,000 million of killed cholera vibrios (V. comma) per cubic centimeter, which may be procured in 20 cc. vials.

Initial vaccination will consist of two subcutaneous injections of cholera vaccine with an interval of from seven to ten days between injections. The first dose shall consist of 0.5 cc. and the second dose shall consist of 1 cc. of the vaccine. A stimulating dose of 1 cc. will be administered every four to six months as long as serious danger of infection is present, or when in the opinion of the surgeon this additional stimulation of immunity is indicated.

3. Plague: The vaccine consists of a suspension of 2,000 million killed plague bacilli per cubic centimeter, which may be procured in 20 cc. vials.

The initial vaccination will consist of two subcutaneous injections of plague vaccine with an interval of from seven to ten days between injections, the first dose consisting of 0.5 cc. and the second dose consisting of 1 cc. of the vaccine. Additional 1 cc. doses may be administered whenever in the opinion of the surgeon additional stimulation of immunity is indicated.

Vaccination alone is not adequate for prevention of typhus, cholera or plague, and the practice of vaccination should, therefore, be considered an adjunct to control measures prescribed by the army medical staff.

The Advantages of Tuberculin Testing Surveys*

Over the X-raying of Entire Groups Without First Tuberculin Testing

L. L. Collins, M.D.†
Ottawa, Illinois

X-RAY INSPECTION OF CHEST OF VALUE BUT NOT ADEQUATE FOR DIAGNOSIS OF CHEST DISEASE

THE value of X-ray as an aid in the diagnosis of pulmonary tuberculosis has been recognized for many years. In fact, it is generally conceded that the X-ray film or fluoroscopic inspection is the only means we have of detecting minimal pulmonary lesions, and that even moderately advanced and some far advanced cases are overlooked without this part of the examination. I do not believe that a clinic for diagnosing tuberculosis can properly carry on its functions without the use of the X-ray or the fluoroscope. The files of any sanatorium will prove this statement. I wish to point out that a program for the *control* of tuberculosis requires more than the X-ray inspection of the chests of groups, whether they be suspects, contacts, high school, industrial or racial.

When the advantage of the X-ray in the detection of pulmonary lesions was recognized and publicized, many doctors gradually began to depend largely upon it for diagnosis. The cost of X-ray inspection of the chests of large numbers created a financial problem difficult for most communities to meet. This problem was partly solved in many places by tuberculin testing the entire group and X-raying only the reactors. The wide use of the tuberculin test which followed resulted in the publication of some conflicting articles which have caused much confusion as to the true value of the test. The introduction in this country a few years ago of X-ray photography by Potter and Lindberg, removed to a large extent the prohibitive cost of taking large numbers of X-rays. The 4 x 5 film could be purchased for 5 cents and the 35 mm. film for even less. It cost but little more to X-ray the entire group using the miniature film than to first tuberculin test the group and X-ray only the reactors, using the 14 x 17 film. The small expense of X-raying the entire group, using the miniature film, has influenced many tuberculosis workers to discard the tuberculin test as a screen and X-ray the entire group. I believe this to be a mistake and it is the purpose of this paper to point out the reasons for this opinion.

TUBERCULIN TEST HIGHLY SPECIFIC AND ACCURATE

I have joined those who have faith in the tuberculin test and who place great reliance on the results of the test. Douglas of Detroit tested a group of cases of pulmonary tuberculosis and found only one who failed to react to the test, and tubercle bacilli were never recovered from the sputum of this case. Ordway of Mount McGregor, New York, in a personal conversation stated that he found in a group of over 2,000 cases only two who did not react to tuberculin whom he believed to have active tuberculosis. At the Chicago Municipal Tuberculosis Sanitarium between 1931 and 1938 we tested over 7,000 cases of definite pulmonary tuberculosis without finding a single non-reactor to tuberculin. However, several cases required the stronger dilutions before a reaction occurred. Myers has repeatedly stated that the tuberculin test is as accurate or more so than any other biological test for any disease. The above experiences confirm this statement. It may be justifiable for us to quibble over the rare case that does not conform to accepted standards, but we must be specific when discussing medical subjects with the general public. For all practical purposes we can correctly state that a person who does not react to tuberculin has no tubercle bacilli; and a person who does react to tuberculin has them in his body.

X-RAY SHADOWS NOT SPECIFIC

X-ray shadows are not so specific that they can be interpreted as due to a tuberculous infection or to some other cause. I have seen a large number of cases in which X-ray interpretation failed, such as the following:

G. C. Female. Age 27. Married. Has three children. This patient complained of a cough for three years and expectoration for one year previous to the present complaint. She lost 15 pounds in weight despite the fact that she was 7 months pregnant. She complained of tiredness for the past winter, and recently of some pain in her right chest. In March 1939 she expectorated blood and had a temperature of 100 to 101, and for this reason was sent to the hospital where an X-ray film inspection was made of the chest. This revealed evidence of disease in the upper lobe of the right lung. A diagnosis of active tuberculosis was made by the roentgenologist. As soon as the patient felt better she was referred to our sanatorium clinic where she was found to be a non-reactor to tuberculin. Because of this fact she was not admitted to the sanatorium; but advised to have complete bed rest at home. Several sputum examinations, including cultures, were made, all of which were negative for tubercle bacilli. A month later this patient had another X-ray film inspection of her chest and the evidence of pathology was gone. Her three children were tested with tuberculin but none reacted. She delivered her baby uneventfully, and since has given birth to another child. She cares for her children without help and is feeling fine three years later.

A. N. Male. Age 30. Had cough, expectoration, loss of weight, fever, tiredness for past two months; and pain in chest, both sides, for about three weeks. He then developed hemoptysis of about one cup over a three day period, and streaked for one week. Because of the hemoptysis he was sent to the clinic for examination. An X-ray was taken which showed evidence of disease in the right apex. He did not react to tuberculin. Because of this he was kept on complete bed rest at home. A month later most of the evidence of disease by X-ray had disappeared. Tubercle bacilli were never recovered from the sputum but pure culture of yeast organisms were found. This man has engaged in hard work for the past three years and is in apparent good health.

M. B. Female. Age 29. Married; has three children. She developed afternoon temperature of 99 to 100 for which no cause could be found. In August 1940 her family doctor sent her to the Mayo Clinic where nothing definite was found in her lungs. She was advised, however, not to have any more children for several years and to get all the rest she could. In April of 1941, she developed a cough, lost a few pounds in weight, and had an afternoon fever of 100 to 101. Because of the previous history and advice, an X-ray film inspection was made of her chest. This showed abnormal shadows in the upper half of the left lung. This was interpreted as a tuberculous process and she was sent to a tuberculosis specialist who advised sanatorium care and pneumothorax. In the sanatorium she was found to be a non-reactor to tuberculin. Pneumothorax was postponed until further study could be made. Tubercle bacilli could not be found in her sputum. Within a month an X-ray film revealed no evidence of disease. Since that time she has led a normal life in her home.

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*Read before the Wisconsin Trudeau Society at Wauwatosa, January 17, 1942.

†Medical Director, La Salle County Tuberculosis Sanatorium.

V. B. Male. Age 50. This case is a little different, but is of interest. This man has been unable to do hard work for years. He has had periodic attacks of coughing, with expectoration, loss of weight, and fever. The present attack was accompanied by some streaking. His physician had an X-ray film made of his chest from which a roentgenologist diagnosed tuberculosis. He was placed in the hospital where sputum was examined and reported to contain tubercle bacilli. He was then sent to the sanatorium for treatment. Here he did not react to tuberculin. All sputa examined in three different laboratories did not yield tubercle bacilli. One month later an X-ray film of his chest revealed no evidence of disease.

O. M. Female. Age 16. This girl complained of loss of weight, tiredness, pains in left chest and afternoon fever. The physical findings showed an area of consolidation and many moist rales in the base of her left lung. A roentgenologist diagnosed childhood type of tuberculosis in the base of her left lung. The patient was sent to the sanatorium clinic where she did not react to tuberculin. Because of this finding the diagnosis was deferred. Sputum examinations, cultures, and guinea pig inoculations were always negative for tubercle bacilli. This girl was permitted to attend school as soon as her symptoms subsided. She has since graduated. She has had two other similar episodes but still does not react to tuberculin. Sputum examination in each of these episodes has been negative for tubercle bacilli. Therefore it has not been possible to diagnose tuberculosis.

S. Male. Age 6. This boy complained of tiredness, refused to play, ran an afternoon fever, and coughed. On physical examination moist rales were heard over the base of the left lung. A roentgenologist diagnosed childhood tuberculosis but the child did not react to tuberculin. Two weeks later this boy coughed up a peanut, and the diagnosis was apparent. The symptoms disappeared and the child is now in good health.

Thus the tuberculin test tells us in forty-eight hours what requires weeks or months to discover otherwise. The following cases also illustrate this point because the tuberculin test resulted in a reaction in each one.

J. H. Male. Age 31. This man developed a fever, cough, expectoration, pain in chest, and lost 15 pounds in weight. About three weeks later he spat up several mouthfuls of blood. A doctor found that he reacted to tuberculin and a private laboratory reported the presence of tubercle bacilli in his sputum. The patient was admitted to a sanatorium but over a period of two months tubercle bacilli were never recovered from his sputum. All symptoms disappeared as well as the shadows on the X-ray film. The diagnosis was changed as no evidence of active pulmonary tuberculosis was found while he was in the sanatorium. This man has engaged in hard work for the past three years and is now apparently in excellent health.

H. B. Male. Age 41. This man developed general aching, cough, expectoration, fever 101, loss of weight, and pains in chest. He spat up several mouthfuls of blood. He reacted to tuberculin and his physician sent him to a clinic where X-ray film inspection showed evidence of disease in the right midlung. The patient was then admitted to a sanatorium where tubercle bacilli were never recovered from the sputum. In a few weeks the X-ray film revealed no evidence of disease. It is my opinion that this man did not have active pulmonary tuberculosis.

D. G. Male. Age 36. This man is one of three alive out of a family of nine children. All others, including the mother, father, and paternal grandfather have died from tuberculosis. The patient, his wife and daughter all react to tuberculin. In April 1941 he had cough and expectoration, and has since lost 15 pounds in weight. More recently he developed a temperature of 103 to 104 with night sweats, and seemed quite ill. X-ray film inspection revealed evidence of disease in the upper lobe of his left lung. He was admitted to a sanatorium where tubercle bacilli were not found in his sputum and his symptoms promptly disappeared. The X-ray shadow also cleared rapidly. Thus we were unable to make a diagnosis of active pulmonary tuberculosis.

These cases are but a few of a rather large number I have seen who do not have tuberculosis, but who do have X-ray shadows identical with those commonly seen in pulmonary tuberculosis. When the tuberculin test is negative, tuberculosis can be ruled out very simply. But when it is positive, more time and study are required for accurate diagnosis.

I am not too humiliated at my inability to rule out tuberculosis from the first X-ray films of this group of patients because these films were seen by such men as Sweany, Davison, Turner and Lindberg, whose opinions are widely respected and they were unable to definitely and conclusively state that we were not dealing with pulmonary tuberculosis. I cite these cases to remind you that the X-ray inspection alone does not afford sufficient evidence from which to make correct diagnoses. The X-ray conferences held by the National Tuberculosis Association, The Mississippi Valley Conference on Tuberculosis, and many other such groups provide an abundance of proof for this statement. It may interest you to know that I have closely observed the cases presented at these conferences for several years, looking for a case with a negative tuberculin test who had active tuberculosis, but to date I have not seen one. These cases are or have recently been sick. Survey groups are usually apparently healthy people, so it may be argued that this may make some difference as we are not apt to find this type of case in survey work.

TUBERCULOSIS IN INDUSTRY AND MILITARY SERVICE

We have two large industries in La Salle county that routinely make X-ray film inspections of the chests of all applicants for employment. No tuberculin tests are administered. I shall present a few cases to illustrate the injustice this procedure causes to some of these applicants:

1. The X-ray film showed an annular shadow near a hilus which was composed of normal lung markings. He was refused employment because the shadow was interpreted to represent tuberculosis by the roentgenologist.

2. This man worked in sand for several years, and the X-ray film showed a few scattered, circular, white shadows resembling small calcifications. There was no change in these shadows over a five year period. Nevertheless, he was discharged because of the X-ray findings.

3. The X-ray film showed an annular shadow in a hilus which was composed of normal lung markings.

This man was refused employment because the shadow was interpreted by the roentgenologist to be due to tuberculosis.

These men have been refused work, and in some instances those of several years employment have been discharged because a routine X-ray film inspection of the chest revealed shadows that the roentgenologist believed to be due to tuberculosis. I have personally examined these men because they were referred to me for treatment.

Three men rejected by the Army were sent to me for treatment because their X-ray films were supposed to show evidence of tuberculosis. In each case the evidence was insufficient. Indeed, each of them was a non-reactor to tuberculin.

A tuberculin test would have revealed that the men in both these groups did not have tuberculosis and that they had not, as yet, received a primary infection.

SUSPECTED REACTIVATION OF TUBERCULOUS LESIONS

Several patients have been sent to me for routine check-up examinations because their doctors thought they were getting relapses of old tuberculous lesions for which they had been treated years before. These patients had been subjected to long periods of complete bed rest at home—one woman for two years, yet three children who were in the home the entire time still do not react to tuberculin. Some of them were sent to the Southwest and one was sent to a sanatorium for a year because of a diagnosis of pulmonary tuberculosis, based primarily on general and respiratory symptoms plus hemorrhage. A tuberculin test revealed that they not only never had tuberculosis but had not as yet received a primary infection. These patients admit that tubercle bacilli were never found in the sputa.

Again the tuberculin test would have prevented the doctors from making this serious mistake and would have spared the patients grave injustices.

SUGGESTED PLAN FOR TUBERCULOSIS CONTROL IN MILITARY SERVICE

The unnecessary huge cost to the government caused by accepting men with tuberculosis for military service in the first world war has recently received much attention. Routine X-ray film inspection of the chests of all selectees is being advocated to prevent the duplication of this expense in the present war. I would like to suggest a plan which is simple, practical and fair. It would place the responsibility for the care of these men where it more properly belongs.

Every man admitted to the armed forces of the government should be tested with tuberculin. Every reactor should have X-ray film inspection of the chest about every six months if possible. This group would represent about 20 to 30 per cent of the selectees. If the X-ray film is clear on admission and on discharge, any active pulmonary tuberculosis that might develop in this group in later life would be the responsibility of the local communities of these men.

All service men who do not react to tuberculin on admission should be retested on discharge. This group would represent about 70 to 80 per cent of the selectees. If no reaction to tuberculin occurred on either admission or on discharge, any tuberculosis that subsequently developed would be the responsibility of the local community of these men. It would not be service connected. Among those who do not react to tuberculin on admission but are reactors on discharge, any illness from tuberculosis that might later occur would be the responsibility of the government. The primary infection would also be service connected.

Such a procedure would enable one to determine the number of men infected with tuberculosis while in the armed forces, and also the branch of service which produced the most infections. It would eliminate the group who might develop tuberculosis in later life which was not service connected.

EDUCATIONAL VALUE OF TUBERCULIN TEST

Most programs for the control of tuberculosis include group surveys for the purpose of finding new cases. I believe the greatest benefit to be obtained from such surveys is the education about tuberculosis the group receives rather than the number of new cases found. This is particularly true in those communities where the incidence of tuberculous infection and the tuberculosis mortality rate are low. If only X-ray inspection of the chest is used in these surveys, much of the education about tuberculosis that the doctor and the community would receive from tuberculin testing, is sacrificed.

The Gallup Poll at one time disclosed that 51 per cent of the people polled believed that tuberculosis is hereditary. Therefore, all in the group who have no family history of tuberculosis naturally conclude that they cannot have tuberculosis. The negative X-ray film which most people have on a single inspection confirms what they already believe, i. e., that they need not be concerned about tuberculosis. The fallacy of this belief is well known. I checked carefully for a history of contact over 3,000 patients with pulmonary tuberculosis who were admited to the Chicago Municipal Tuberculosis Sanitarium from 1933 to 1936. Thirty-four per cent, or practically one-third, gave a history of known contact, 66 per cent had no idea where or from whom they might have contracted tuberculosis. Fifteen per cent of all the tuberculin reactors discovered in the high school surveys in La Salle county gave a history of contact, while the remaining 85 per cent of the reactors in the same survey were surprised to learn that they were infected with tubercle bacilli and therefore might at some future time require treatment for active tuberculosis.

It is much easier to interest a patient in tuberculosis if he has a tuberculin reaction than it is if the result of the tuberculin test is not known. Indeed many of our high school reactors became concerned and with their parents arranged for an interview with the medical director of the survey so that they might better understand what the reaction means and what procedure they should follow in the future to assure themselves that they will not be subjected to long lingering illness or death from tuberculosis. Often the parents and other members of the family went to the family doctor to be tested. As a result the doctors became more interested and a larger number of people were examined for tuberculosis. Where several members of the family reacted to the test a search was made for the possible source of infection in that family. All tuberculin reactors were definitely informed that a negative X-ray meant only that there was no gross area of disease in the visualized parts of their lungs at the time it was made. The importance of having X-ray film inspection of the chest at least once each year if in good health and oftener if they should develop symptoms was stressed. All non-reactors to tuberculin were told that they had not as yet been infected with tubercle bacilli. The fact that they can be infected and might be at some future time was strongly emphasized. They were urged to have a tuberculin test each year as long as they remained non-reactors and an X-ray film of the chest each year if they became reactors.

The following cases illustrate some of the good results that can be expected from such a program.

L. M. Female. Age 19. This girl had an X-ray film inspection of her chest in April 1938, because of a tuberculin reaction. As a routine procedure another film of her chest was made in May 1939, when a small area of disease was found in the right lung.

M. M. Female. Married. This woman had a tuberculin reaction in 1936. During the next two years the X-ray films revealed no evidence of disease in her lungs. In 1938, however, minimal pulmonary tuberculosis was discovered.

M. J. M. Female. This woman reacted to tuberculin in 1937. The X-ray film of her chest then as well as in 1938 and in 1939 revealed no evidence of disease. However, in June 1940 an area of disease was discovered in the apex of her right lung.

W. L. Male. This boy was first found to be a non-reactor to tuberculin as a freshman in high school in 1938. The test was repeated each year and he reacted for the first time in the fall of 1941. His parents were concerned and brought him to the clinic. They were informed that the boy had been infected sometime during the past year. The mother was certain that she could not have been responsible because she felt better the past summer than she had for years. Both parents reacted to tuberculin. The father's lungs were clear but the mother was found to have chronic pulmonary tuberculosis with tubercle bacilli in her sputum. The son was also found to have minimal pulmonary tuberculosis.

The Family Physician

I made a study of 1,000 consecutive cases of pulmonary tuberculosis and discovered that 74 per cent were first diagnosed by a private doctor. Douglas reported a similar study in 1937 in which the percentage was 65 in Detroit. The family physician, therefore, is the most important factor in any program for the control of tuberculosis. He will readily take part in a tuberculosis program and support it if he is given something definite to do. Tuberculin testing surveys offer a splendid opportunity to interest the family doctor in a tuberculosis program. Indeed, surveys in De Kalb and La Salle counties are conducted by the family doctors, for which they are paid.

Non-reactors are urged to have the test repeated each year unless they become reactors, in which case they are to have annual X-ray film inspections of their chests. Reactors are urged to have routine annual X-ray film inspections of their chests regardless of apparent good health. This advice is sent in a letter to the parents of every person tested. A copy is sent to the family doctor designated by the patient. Conflicting statements by the different physicians are thus reduced to a minimum—practically none once the program gets under way.

In our clinics during the fiscal year, June 1, 1940, to May 31, 1941, 508 tuberculin reactors reported for examination, the tests having been administered by their family doctors. If we estimate the non-reactors, I think that at least 1,002 patients were tested by the family doctors in their offices. The result of this coöperation between the private physician and the tuberculosis program has been responsible for the finding of many cases of tuberculosis while in the minimal stage.

Forty-one per cent of all new cases of tuberculosis discovered in La Salle county last year and 53 per cent of those discovered in De Kalb county were in the minimal stage. The part the family doctor had in conducting the tuberculin testing surveys in these two counties is largely responsible for the excellent results obtained.

Consents for Tuberculin Test

I wonder if more people would submit to an X-ray inspection of their chests than to a tuberculin test? In one of our high schools with a student body of over 1,000, 98 per cent of the students submitted to the test and 20 per cent reacted. In another high school of similar size only 65 per cent submitted to the test and 15 per cent reacted. In still another high school of like size, 69 per cent submitted to the test and only 14 per cent reacted. It is interesting to note that the last two communities with the low percentage of reactors have higher morbidity and mortality rates than the community with the higher percentage of reactors.

In a high school with thirty-two students all but one submitted to the test. Personal conversation with this student brought out the fact that her parents objected because her sister died from pulmonary tuberculosis. How many of those who refuse to take the tuberculin test do so because they are afraid something might be found, is difficult to determine. Where this is the case, I am sure they would also refuse the X-ray film inspection. Indeed, I offered the above girl a free X-ray film of her chest without the tuberculin test but it was refused. I have had only one patient who refused absolutely to have the test but who would submit to X-ray examination.

Total X-ray Surveys

I believe there is a place for total X-ray surveys. The work done under the direction of Tice in Chicago is an excellent example but this is an unusual situation. A section of the city with the following conditions present was selected.

1. A district with a death rate for tuberculosis of 301.6 per hundred thousand, whereas most communities have a mortality rate for tuberculosis of 20 to 50 per hundred thousand.

2. A group of over 10,000 people was examined.
3. This group lived under substandard conditions.
4. It would be difficult to get the total group together for a second time.
5. The entire family was surveyed.
6. The X-ray equipment was practically taken to the patient's doorsteps, as a mobile X-ray unit was used.
7. It was difficult to reach all of these people for the necessary educational work that should precede all tuberculin testing. With a mortality rate of 301.6 per hundred thousand and a percentage rate of active tuberculosis discovered of 4.24 per cent, no doubt a high percentage of the population would have reacted to tuberculin.
8. It is unquestionably true that large numbers were examined with this type of X-ray program, conducted as it was, who would not have been reached if the tuberculin test had been required before the X-ray inspection was made.

SUMMARY AND CONCLUSIONS

1. Education is the most powerful weapon we have to combat tuberculosis. The tuberculin test is the best means we have of taking this education into the home. Total X-ray surveys sacrifice this education.
2. The incidence of tuberculosis infection in a community can be determined only by the tuberculin test.
3. An occasional case of active tuberculosis not in the survey may be discovered because of a tuberculin reactor found in the survey. This is impossible where total X-ray survey is used.
4. Tuberculin testing surveys provide an excellent method of securing the interest and the coöperation of private doctors in a program for the control of tuberculosis. This is particularly true if the family physician administers the tests. The coöperation of the family doctor is essential if the program is to succeed.
5. A person who discovers through the tuberculin test that he is infected with the tubercle bacillus is much more likely to have discovered any clinical tuberculosis he may subsequently develop earlier than he would if the reaction were not known. The non-reactors understand that they may some day be reactors and should, therefore, have the test repeated each year. A surprisingly large number follow through annually with X-ray films of their chests or tuberculin tests. Active tuberculosis developing several years later has been found in each of these groups, and all have been discovered while still in the minimal stage.
6. The hereditary myth is exposed as is shown by the 85 per cent of reactors without a known history of contact. Total X-rays of this group would only tend to strengthen their belief that tuberculosis is hereditary and that they, therefore, need not be concerned.
7. Often a patient with a history of tuberculosis in the family discovers that he has not yet been infected. Unwarranted worry is thus dispelled.
8. The serious danger of diagnosing tuberculosis in uninfected persons by X-ray inspection only is eliminated, thus sparing some persons a grave injustice.

Tuberculosis of the Trachea and Bronchi*

Jose Antonio Perez†
Cordoba, Argentine

TUBERCULOUS lesions of the trachea and bronchi have been recognized since early times,[1] but deserved emphasis has not been given to them until recently. Within the last few years pathologists, clinicians and bronchoscopists have united to improve the diagnosis of these lesions and determine their effects with precision. The early lack of exact information is probably to be explained by the fact that the symptomatology of tracheal and bronchial lesions was not clearly separated from that due to the pulmonary disease. The development of bronchoscopy particularly (Jackson) and its application in pulmonary tuberculosis[2] have resulted in much more exact knowledge of the bronchial tree than was the case heretofore and a better knowledge of its pathology.

The bronchial factor in the development of pulmonary tuberculosis. The important part played by the bronchial tree in the canalicular spread of pulmonary tuberculosis is well known. Infectious material may be disseminated by this route not only from parenchymal pulmonary lesions, but also from caseous lymph nodes which ulcerate through the bronchial wall and discharge their content into the bronchial lumen.

Relation between the bronchi and the size of tuberculous cavities. Tuberculous cavities are influenced in a decisive way by the state of the draining bronchi. The surprising changes frequently seen in cavity size are usually due to changes in the anatomical condition of the bronchus, which may act like a valve, permitting easy ingress of air during inspiration but rendering expiration from the cavity difficult and bringing about an increase in gas tension of the cavity with corresponding enlargement.

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*From the Henry Phipps Institute, University of Pennsylvania, Philadelphia.

†Fellow of the Division of Medical Sciences, Rockefeller Foundation, Instituto de Tisiologia de Cordoba, Argentina.

The bronchus and the healing of cavities. The role of the bronchus in the mechanism of cavity closure is important. This has been emphasized by Long[3] who referred to the healing of certain types of cavities as "presumably due to obliteration of the draining outlet and eventual scarification." Auerbach and Green,[4] after study of abundant pathological-anatomical material, established the fact that closure of cavities with healing results after closure of the draining bronchus. They wrote: "The bronchi entering the tuberculous cavity are often narrow and show tuberculous changes similar to that of the cavity wall. The proliferation of the endobronchial granulation tissue may unite the opposing surfaces. Closure of the bronchi may be aided by the contraction of the cavity wall, thus narrowing and approximating the bronchi at the broncho-cavity junction." Pinner[5] in discussing this article, stated that bronchial occlusion, as one possible mechanism, is not to be questioned, but "the statement that bronchial occlusion is the only possible mechanism is open to doubt." The frequency and importance of this method of cure presumably will be established ultimately by the united efforts of pathologists, clinicians and surgeons.

Coryllos[6] emphasized the fundamental role of the bronchus in the arrest of lesions treated by collapse therapy. According to his concept, occlusion of the draining bronchus is indispensable for the success of surgical closure of a cavity. In his view the later modifications brought about by bronchial closure, including changes in the tissue environment of the tubercle bacilli, constituted the immediate cause of healing.

Tuberculous lesions and bronchial stenosis. A bronchus may be narrowed by tuberculous adenopathy with resultant atelectasis of the corresponding pulmonary segment. Torsion also will bring about occlusion. In both of these instances the cause of the stenosis is extramural, according to the classification of von Schroette, which is followed by Eloesser.[7] In other instances the obstruction is intramural, as from the penetration of a bronchial wall by a tuberculous gland with discharge of caseous material in the lumen. As Eloesser notes, however, mural involvement, i. e., change in the wall itself, is the most frequent cause of tuberculous bronchial stenosis. Mural obstruction results from caseous ulceration, submucous hyperplastic infiltration, a tuberculous granuloma or a fibrous scar resulting from the healing of any of these lesions.

The stenosing form of bronchial tuberculosis is the form most emphasized; it is manifested by clinical, radiological and bronchoscopic evidence, including sibilant rales in a definite part of the chest, atelectasis or obstructive emphysema, rapid increase in the size of the radiological image of a cavity without other evident cause, great variation in the daily amount of expectoration, and, finally, by the bronchoscopic picture.

The results of tuberculous bronchial obstruction are evident in various parenchymatous changes, among which are atelectasis, which may proceed to contraction of a whole lobe, disappearance or increase in size of tuberculous cavities, obstructive emphysema, etc. On the other hand infection may result from retained secretions. Bronchial stenosis also may prevent proper re-expansion of the lung after discontinuance of artificial pneumothorax.

Bronchial lesions and positive sputum. In a certain number of cases treated adequately by pneumothorax or thoracoplasty, the sputum remains positive for tubercle bacilli in spite of a perfect pulmonary collapse with disappearance of radiological evidence of cavities. In such cases bronchoscopic examination frequently reveals a bronchial tuberculous lesion as the source of the bacilli. In other cases, in which little or no pulmonary involvement is apparent in X-ray films, bronchial lesions are responsible for positive sputum (Ornstein and Epstein,[8] Barnwell, Littig and Culp[9]).

Bronchiectasis. In terminating this rapid listing of the bronchial alterations complicating pulmonary tuberculosis, mention should be made of bronchiectatic lesions which frequently are sequelae of the pulmonary lesion and persist as obstacles to healing.

MATERIAL STUDIED

The foregoing brief exposition of the clinical problems involved in tuberculosis of the trachea and bronchi indicates that bronchial lesions are important complications of pulmonary tuberculosis. It appeared of interest to make a detailed examination of the tracheo-bronchial passages of a series of typical cases of advanced tuberculosis to determine the frequency and character of tuberculous lesions. The investigation here reported, which is the first of a series planned, was based on the pathological-anatomical study of the lungs of ten patients dying with advanced pulmonary disease. The specimens examined consisted in practically all instances of the anterior or posterior half of a pair of lungs, the other half of which had been mounted for museum preservation as illustrating some type of advanced tuberculosis. In each case a careful dissection was made in such a way as to expose the bronchial system to be studied. A diagram was made in each case, in which was recorded the site of each of a variety of sections studied. Routinely specimens were taken from the following parts: (a) trachea, (b) main bronchi, (c) stem bronchus to a tuberculous pulmonary lobe, usually one of the upper lobes, and (d) small intralobular bronchi. The system was varied somewhat according to the interest in a given case. Sections were taken in such a way as to be typical of the part to be studied, rather than for exceptional interest in the case of unusual lesions. Accordingly the number of sections varied with the case. The number of blocks taken from different parts in different cases ranged from 6 to 14. In one case, in which a cavity grossly appeared to be completely blocked, 128 microscopic sections of the draining bronchus were cut serially.

TABLE I*

		Macroscopic Findings		Microscopic Findings			
Case Number	Necropsy Number	Trachea	Main Bronchus	Trachea	Main Bronchus	Main Bronchus to Each Lobe	Sub-branches Within the Lobes
1	707	H	H DU	I Ep	C DU	C SU	C SU
2	728	H SU	O		I	I Ep SU	I Ep C SU
3	729	SU	SU	I	H I SU	I SU	S Ep C SU DU
4	735	H	H SU		I SU	O	Ps I Ep C SU
5	742	H	H	I	I	G I D Ep H SU Ps	H I Ep SU
6	745	H SU	H SU	I Ep SU G	H Ep	G I Ep SU	G I Ep
7	748	H	H	O	H	Ep	H E Ps I
8	759	H	H	I	E I	G I Ep SU	G Pc I
9	760	H SU	H	I SU	I	I	G I Pc Ep Ps C A SU
10	768	H	H		H I	A I	H I B Ep S D
Totals		9 (H) 4 (SU)	8 (H) 3 (SU) 1 (O) 1 (DU)	1 (G) 1 (O) 6 (I) 2 (Ep) 2 (SU)	1 (E) 4 (H) 7 (I) 1 (Ep) 1 (C) 2 (SU) 1 (DU)	1 (O) 1 (H) 1 (A) 7 (I) 3 (G) 5 (Ep) 1 (D) 1 (C) 1 (Ps) 6 (SU)	1 (E) 3 (G) 1 (A) 8 (I) 1 (B) 7 (Ep) 3 (H) 5 (C) 3 (Ps) 6 (SU) 2 (Pc) 1 (DU) 2 (S) 1 (D)
Cases with specific tuberculous lesions			4	4	4	7	9

*O—no lesion found
H—hyperemia
E—edema
G—granulation tissue
Pc—caseous peribronchitis
Ps—sclerosing peribronchitis
S—sclerosis
B—bronchial dilatation
D—diminution of bronchial lumen
A—absorption of cartilage
I—Inflammatory infiltration of the mucosa
Ep—epithelioid tubercles in the mucosa
C—caseation in the mucosa
SU—superficial ulceration
DU—deep ulceration

The alterations discovered in the trachea and bronchi of the 10 cases studied are summarized in Table I. The abbreviations used are explained in the footnote to the table. The record made indicates the actual findings in the cases studied; obviously it cannot be taken as indicating the exact condition of all comparable parts, e. g., the condition of the corresponding bronchus on the opposite side, or a similar bronchus on the same side. In general the effort made was to study a typical area in which the presence of tuberculosis might be suspected.

RESULTS

Lesions of the trachea. Gross congestion was observed in 9 of the 10 cases, and in 4 cases superficial ulceration was seen macroscopically. Microscopic study was made in only 7 cases. As the table indicates, non-specific inflammatory infiltration of the mucosa was observed in 6 of these. More advanced changes noted were epithelioid tubercles, superficial ulceration and granulation tissue. If the diagnosis of specific tuberculous lesions is limited to the observation of these more advanced changes, tuberculous lesions were encountered in 3 of the 7 tracheas studied. In one case the gross diagnosis was recorded as negative, but microscopic study detected epithelioid tubercles in the bronchial wall. In another case superficial ulceration was noted grossly, whereas microscopic examination showed no more advanced change than inflammatory infiltration; this result is presumably explained by the selection of tissue involved.

Lesions of the main bronchi. Like the trachea the main bronchi showed congestion in the great majority of cases. On gross examination superficial or deep ulcers were found in 4 of the 10 cases. Microscopic examination demonstrated tubercles or tuberculous ulceration in all of these and inflammatory infiltration in 3 additional cases, as well as the other minor changes indicated in the table.

Lesions of the stem lobar bronchi. Macroscopic examination was not recorded routinely in these bronchi, but gross ulcers were observed in the mucosa of bronchi draining cavities. Microscopic study revealed more extensive changes than those seen in the trachea or main bronchi. Nonspecific inflammatory infiltration was evident in 7 cases. Specific tuberculous changes, as indicated by the presence of epithelioid tubercles, caseation and ulceration, were observed in 7 of the 10 cases. Deep ulceration, of the type leading to contraction, was not observed. However, in one case marked reduction of the lumen, of different origin, was observed. This was a case of thoracoplasty in which the whole left upper lobe was collapsed and a cavity had been reduced to a fissure. In this case the reduction in size of the lumen of the bronchus draining the cavity appeared to be in part the result of the operation and in part the sequel of tuberculous changes. Epithelioid tubercles were discovered in the wall, which was superficially ulcerated, and there was extensive formation of granulation tissue with peribronchial sclerosis.

Lesions of the small intralobar bronchi. As might be expected, lesions in these bronchi proved to be more extensive than in the larger branches of the tracheobronchial tree. The table indicates the variety and frequency of the changes observed microscopically. Definite tuberculous changes were found in the bronchial walls in 9 of the 10 cases examined. These changes consisted of epithelioid tubercles, caseation and both superficial and deep ulceration. Caseous and sclerosing peribronchitis were common. In one case the changes discovered were limited to nonspecific changes, including hyperemia, edema, peribronchial sclerosis and recent inflammatory infiltration. Presumably sections of other small bronchi draining tuberculous regions would have yielded evidence of bronchial tuberculosis, as in the other 9 cases.

COMMENT

Leaving out of consideration the small bronchi, which are so intimately related to the lung that distinction from the pulmonary parenchyma is difficult, we note that tuberculous changes were found in the main tubular passages of the respiratory tree in 9 out of 10 cases. The one case in which neither the trachea nor the large bronchi showed tuberculous changes was an instance of old and almost arrested bilateral excavating tuberculosis of several years evolution, in which death resulted from acute nontuberculous pneumonia. In this case epithelioid tubercles were present in the walls of the small intralobar bronchi. Thus it is evident that tuberculous involvement of the bronchi is almost universal in the main bronchi in advanced pulmonary tuberculosis, but rarely may be absent. However, in only a small percentage of the cases were the bronchial changes sufficiently deep seated to cause extensive damage to the main respiratory passages.

SUMMARY

The lungs of 10 advanced cases of tuberculosis were studied for evidence of tuberculous changes in the tracheobronchial tree. Tuberculous lesions were encountered with increasing frequency as examination was extended to deeper parts of the respiratory system. Tuberculous involvement was found in the great majority of cases in the trachea, main bronchi or stem bronchi to the pulmonary lobes, and in practically all cases in the walls of the small bronchi draining tuberculous regions. The tuberculous changes consisted of mural caseation and epithelioid tubercles and superficial and deep ulceration. Deep excavation of the wall and cicatricial changes leading to contraction were uncommon in the material studied.

BIBLIOGRAPHY

1. Riggins, H. McLeod: Tracheobronchial tuberculosis—pathogenesis, pathology and pulmonary sequelae, Tr. 35th annual meeting Nat. Tuberc. A. 341, 1939.

2. Clerf, Louis H.: Is bronchoscopy indicated in tuberculosis? J.A.M.A. 97:87, 1931.

3. Long, Esmond R.: Tuberculous cavities—some features in their genesis, development and healing, Journal-Lancet 55:191, 1935.

4. Auerbach, Oscar, and Green, Henry: The pathology of clinically healed tuberculous cavities, Am. Rev. Tuberc. 42:707, 1940.

5. Pinner, Max: Healing of tuberculous cavities, Am. Rev. Tuberc. 42:731, 1940.

6. Coryllos, Pol N.: Mechanics and biology of tuberculous cavities, Tr. 31st annual meeting Nat. Tuberc. A. 109, 1935.

7. Eloesser, Leo: Bronchial stenosis in pulmonary tuberculosis, Am. Rev. Tuberc. 30:123, 1934.

8. Ornstein, G. G., and Epstein, I. G.: Tuberculosis of the major bronchi with little or no manifest pulmonary tuberculosis, Quart. Bull., Sea View Hosp. 3:109, 1938.

9. Barnwell, John B., Littig, John, and Culp, John E.: Ulcerative tuberculous tracheobronchitis, Am. Rev. Tuberc. 36:8, 1937.

Clarence Martin Jackson -- A Great Physican

(*A Personal Appreciation*)

J. A. Myers, M.D.

Minneapolis, Minnesota

WHEN an infant is born, there is considerable wonderment in the minds of the members of the community as to what is in store for the individual and what the infant holds in store for the world. On April 12th, 1875, the citizens of What Cheer, Iowa, might have discussed numerous future possibilities of the infant born on that day. The father, Dr. John C. Jackson, and the mother, Mrs. Adeline Hartman Jackson, named him Clarence Martin.

Eighteen hundred seventy-five was a splendid time to be born in the United States. The nation was at peace and was a democracy in the strict sense of the word. Parents could do for their children whatever they desired to the limit of their financial ability; children were free to do for themselves whatever they desired within the limits of their physical and mental capacities. Therefore, Dr. and Mrs. John C. Jackson nurtured their new son through infancy and early childhood. It was obvious that he had a good mind but they realized that such a mind is of little value unless it is properly directed and trained. Clarence Martin completed the grade school work at Harper, Iowa, a village of about 300 population, where the family had moved. A complete high school course was not offered at Harper, so he entered the preparatory department of Drake University in Des Moines in 1892. The next year he taught in a rural school near Martinstown, Missouri. His family moved to that state and in the fall of 1894 he entered the University of Missouri at Columbia. From here he received the degree of Bachelor of Science in 1898; the next year he was granted the degree of Master of Science and in 1900 the degree of Doctor of Medicine. He was also awarded the honorary L.L.D. degree in 1923.

Dr. Jackson's work was of such a character that he was appointed Instructor in Anatomy at Missouri for the years 1899 to 1900. During the next two years he was assistant Professor and in 1902 he was appointed full Professor and Head of the Department of Anatomy. His unusual ability and devotion to work were responsible for this rapid promotion. He was Professor of Anatomy only seven years when he was advanced to the Deanship of the Medical School of the University of Missouri.

Clarence M. Jackson

During these years of teaching Dr. Jackson craved association with other prominent persons in the field of anatomy in various parts of the world. Therefore, in 1900 he went to the University of Chicago and did graduate work under Barker and Donaldson. In those days most of the famous anatomists were in Europe. He desired to learn their methods of teaching and research, so that he spent 1903 and 1904 in Leipzig and Berlin. That was the time when Germany was at the height of her power in scientific and medical attainment; the entire world looked to her for instruction in these fields. World renowned men had made splendid contributions to the welfare of mankind everywhere and the spirit to do good prevailed. Von Behring had already made notable contributions to our knowledge of diphtheria and tetanus. Koch had discovered the tubercle bacillus, Wassermann was about to announce his test for syphillis and Ehrlich his chemotherapy for this disease. Indeed, world renowned workers were to be found in nearly every phase of medicine but it was mainly the anatomists, His, Spalteholz and Waldeyer, who attracted Dr. Jackson to Germany.

Dr. Jackson was such an unusual teacher, administrator, and research worker that he was favorably discussed by his students wherever they went and by all others who had had the privilege of meeting him. Thus, early in life he became widely known. When Dr. George Vincent, President of the University of Minnesota, decided to reorganize the Medical School, he desired to have the Department of Anatomy headed by the most capable and most promising young man available. Dr. Clarence M. Jackson possessed all of the necessary qualifications and he was appointed in 1913, under Dean E. P. Lyon.

On assuming duties as Instructor in Anatomy at the University of Missouri in the fall of 1913, I heard every faculty member express regret that Dr. Jackson had left that institution. It was obvious that he had gained the admiration and respect of all and no one believed he could ever be adequately replaced. He was eulogized so frequently and by so many persons that one could only hope to have an opportunity to meet him and be instructed by him.

In the summer of 1914, while I was at Cornell University, a letter written in longhand arrived from Dr. Jackson. There had been no previous correspondence and this was my first contact with him. In this letter he offered me a position as Instructor in his Department. The beautiful penmanship, the exactness of statement and the fairness and honesty expressed, reflected his great character and further increased my desire to learn from him. Although other positions with higher rank and larger salaries were in the offing, Dr. Jackson's qualities outbalanced them and the position with him was immediately accepted. In the fall of 1914, about a week before school opened, I reported to his office for assignment of work and, thus, the long hoped for desire to meet him was realized. He was tall, had a splendid physique, and was handsome in every sense of the word. He was only thirty-eight years old. His hair was jet black and his eyes so penetrating as to make one believe that he would promptly detect any wrong-doing—past, present or future. His voice and manner inspired confidence and he was the personification of kindness; in fact, one could only hope to have life-long association with him.

Dr. Jackson organized the Department of Anatomy in a unique manner. Every staff member was given an opportunity to do the kind of work he liked best. Those who wished to teach were assigned heavy teaching schedules, while those who desired to do investigative work were provided with every facility in his power. Dr. Jackson kept in close touch with the activities of everyone on his staff. It was almost uncanny how much he knew about our work in every detail and somehow he accomplished this without creating any antagonism; indeed, we felt that it was because of his great personal interest in our welfare.

For several months after my arrival, each Saturday afternoon there would be a light rap on my door. Dr. Jackson would enter and spend as much as an hour helping to solve my difficult problems. He could always be found in his office at some time, even on Sundays and holidays. He never worked by the clock. He lived for his Department and the University, always willing to impart knowledge to others and promote their welfare.

In gross anatomy he assigned instructors to teaching sections but he always knew what the students as well as the instructors were doing in each section. At examination time, each instructor graded the papers in his section after which they were handed to Dr. Jackson. He read every one in great detail after which he went over them with the instructors and pointed out why he thought certain papers deserved slightly lower or higher grades than the instructors had designated. This inspired the confidence of his staff members because there was no changing of grades without their knowledge and there was always sufficient reason. This also served as splendid instruction for us. He carefully supervised and encouraged research work in the Department and when we had prepared our manuscripts so we thought they were ready for publication, he read them with the greatest of care and always made important and valuable suggestions and criticisms. He even corrected punctuation and always presented his reasons for every change.

Because of large numbers in the anatomy classes, some of the students were of the opinion that Dr. Jackson did not know them by name. On several occasions, however, he demonstrated that this was not true. He was fearful that students might be injured on the automatic elevator and therefore he established a rule that this was not to be used by them. One day a student boarded the elevator to ride to the first floor, but when he reached this floor the elevator did not stop. When the top floor was reached the door opened and Dr. Jackson entered. The time of day was passed and this student told his classmates that it was fortunate for him that Dr. Jackson did not know his name. However, the next day when the class assembled, this student was called for the first recitation and he was quizzed far beyond the usual time to the great surprise of the student, himself, and the delight of his classmates. This was not a coincidence.

At the University of Minnesota Dr. Jackson became a member of Phi Beta Phi Medical fraternity and he has done much to assist the students in this organization. Their appreciation of him and his greatness was expressed by establishing an annual Clarence Martin Jackson lectureship.

Dr. Jackson has published more than one hundred articles in scientific and medical journals. In addition to his research, he edited Morris' *Human Anatomy* from the fifth to the ninth editions, inclusive. This was a huge task but each time he revised this large volume so well that it is the leading textbook in anatomy in America. He wrote a monograph on the *Effects of Inanition Upon Growth and Structure*. He also contributed to other books such as *Growth, The Measurement of Man*, and *The Kidney in Health and Disease.* His numerous research papers are included with those of the Staff in a series of sixteen volumes on *Contributions From the Department of Anatomy, University of Minnesota.*

Dr. Jackson has always been a regular attendant at the annual meeting of the American Association of Anatomists and was President of this organization from 1922 to 1924. This is the highest honor that American anatomists can bestow on one of their members. He is a member of the Advisory Board of the Wister Institute of Anatomy, a position which he has held for many years. For a long time he has been Chairman of the American Committee on Anatomical Nomenclature, and American member of the International Commission on Anatomical Nomenclature. He attended the International Medical Congress at Madrid in 1903, the International Congress of Anatomy at Amsterdam in 1930 and at Milan in 1936 where he represented the American Association of Anatomists.

For several years the Minnesota State Medical Association has presented a distinguished service award to the person thought to be most deserving in the organization. This was always granted to clinicians until 1941 when Dr. Jackson was the recipient. The presentation reads as follows:

> MINNESOTA STATE MEDICAL ASSOCIATION
>
> Be it known by virtue of the authority vested in the Council of the Minnesota State Medical Association by its House of Delegates that the distinguished service medal of the Association is hereby awarded to
>
> CLARENCE MARTIN JACKSON
>
> in recognition of his years of faithful service on the Minnesota State Board of Examiners in the Basic Sciences and for his illustrious achievement in the fields of anatomy and teaching, whereby his influence has been evident in the lives and work of many physicians and honor has been reflected on the medical profession of Minnesota.

Dr. Jackson has always taken an active interest in the practitioners of medicine which they greatly appreciate, partially because he has instructed so many of them. In fact, he has been President of the Minnesota State Board of Examiners in Basic Sciences since 1930.

Because of his splendid scientific attainment Dr. Jackson was early elected to membership in Sigma Xi. On June 8th, 1940, the Minnesota chapter presented him with the distinguished service award which reads as follows:

> To Clarence Martin Jackson, Professor of Anatomy at the University of Minnesota, for his contributions to our knowledge of growth and nutrition, for his unselfish and courageous support of fundamental research, and for his effective efforts in behalf of productive scholarship The Minnesota Chapter of the Society of the Sigma Xi gratefully presents this testimonial of appreciation.

Every place he worked Dr. Jackson received the highest honors for scholarship, having been elected to Phi Beta Kappa and to the medical honorary fraternity, Alpha Omega Alpha. For many years his biographical sketch has appeared in *Who's Who in America* and he is a starred member of *American Men of Science*. In addition to serving as Head of the Department of Anatomy at the University of Minnesota he was Chairman of the Medical Graduate Committee from 1915 to 1941. He was also called upon to serve as Acting Dean of the Graduate School from 1917-1918 and again in 1925. In 1923 and 1924 he was Chairman of the Medical Division of the National Research Council in Washington, D. C., and was for many years Associate Editor of the *American Journal of Anatomy*.

In the fall of 1915, when told that a tuberculous lesion existed, I immediately consulted Dr. Jackson, thinking it would be necessary to resign my position. He was sympathetic and manifested almost unbelievable understanding of the situation. He then confided that this disease had previously attacked one member of his own family and other close relatives. Instead of accepting my resignation, he arranged for my leave of absence with almost full salary. He then offered excellent advice and recommended a first-class sanatorium with rates within my means. When I resumed my work a year later, he made special provisions for extremely light teaching and research schedules. Years later he bestowed upon me a great honor when he referred a member of his family concerning a tuberculosis problem and a near relative for treatment of a pulmonary condition.

Having become interested in the practice of medicine, I went to Dr. Jackson's office in the spring of 1918 to discuss my plans. He was gracious in offering me promotion in rank, with increase in salary, and at the same time stated that he would do everything possible to assist me if the decision was finally made to transfer from anatomy to clinical medicine. He has kept his word and in all the years that have since passed I have sought his advice in every proposed major activity or undertaking. He has never been too busy to give the requested advice and it has never been wrong.

At the time of Dr. Jackson's retirement in 1941 his past and present staff members were so appreciative of all he had done for them that they wrote him personal letters of appreciation. These were bound and presented to him with the following statement:

> "This volume is presented to Doctor Jackson that he may have lasting evidence of the affection and appreciation of his staff, both past and present."

Space permits brief statements from only a few of these letters:

"The association with you twenty-five years ago is still so vivid in my memory that it continues to play a part in my life and will do so, I am sure, to the end." Dr. E. C. Albritton, George Washington University.

"You gave me my first interest in research at a time when investigative work was not popular and where it had to be done without much support. All through my life I have felt that you were in the background, ready to support me when I needed help." Dr. E. T. Bell, University of Minnesota.

"It gives me considerable pleasure to write this letter which expresses my appreciation for all the help, advice and encouragement that you have given me over a period of some thirty years. I was one of the fortunate few to be associated with you in the beginning of my medical work at the University of Missouri. I was again favored when you decided to come to Minnesota and had the privilege of working with you in your Department here,—while we all regret that it is time for you to retire, we all feel that you have earned whatever benefits, privileges, and enjoyment that you can have for the remainder of your life." Dr. Walter E. Camp, University of Minnesota.

"I need not tell you that as a young boy in the university I idolized you and you have always been my first and greatest stimulus through your example in striving for success. So well do I remember your coming to the anatomical building the first in the morning and leaving last at night and always working with the objective enthusiasm of a real scientist to attain the truth. Your photograph has long been in my study and has always been my greatest inspiration." Dr. Walter E. Dandy, Johns Hopkins Hospital, Baltimore.

"No one could work under you and not be stimulated to more conscientious effort, a better sense of values, and to higher ideals." Dr. Walter A. Fansler, University of Minnesota.

"Your methods of work and steadfastness of purpose have always stood out in my mind as a goal which I wish I could attain." Dr. Clay B. Freudenberger, University of Utah.

"Dr. Jackson's lessons in the 'give and take' of life are even greater than his masterly instructions in anatomy." Dr. Thomas J. Heldt, Henry Ford Hospital, Detroit.

"What you have taught will never be forgotten by us who have studied with you or lost to those who will come after us." Dr. N. M. Levine, Manhattan General Hospital.

"After thirty years, your influence as a teacher and as a most helpful friend is still my most pleasant memory of university life." Dr. Caroline McGill, Butte, Montana.

"It was you more than anyone who taught me the necessity of continuing painstaking, planned attention to detail in the prosecution of successful scientific investigation." Dr. J. C. McKinley, University of Minnesota.

"When one's daily work has been pleasant and happy far beyond that of most people, and one must confess that you helped positively to make this possible, it is but another way of saying that one's debt to you could never be repaid." Dr. H. L. Osterud, Medical College of Virginia.

"Your systematic pursuit of a well organized line of research has set so high a standard that it will be difficult to match. Your example has made an indelible imprint that will be a beacon saving us from many pitfalls," Dr. A. T. Rasmussen, University of Minnesota.

"I count it one of the greatest privileges in my stay at the university to have known you, both as a great teacher and as a friend; the one member of the faculty I remember best and hold always in highest esteem." Dr. R. E. St. Clair, LaVerne, California.

"You inspired my interest in research and you opened the door of opportunity for me . . . . I am more grateful to you than words can express." Dr. Chester A. Stewart, University of Louisiana.

"The Jackson tradition will be carried on at the University of Minnesota by the impress which you left upon many of those who were fortunate enough to be associated with you through the long years." Dr. Owen H. Wangensteen, University of Minnesota.

Dr. H. S. Diehl, Dean of Medical Sciences of the University of Minnesota, says:

"Having been associated with Dr. Jackson in various relationships of student and teacher, of colleagues on the medical faculty, and of dean and professor, I can say that he has been a truly great teacher, scholar, scientist, and administrator. In these various capacities Dr. Jackson has played an important role in the development of both the Medical and the Graduate Schools of this University. Upon this Institution as well as upon the lives and careers of his many students, he has exerted an influence that will carry on far beyond our present time."

When he was handicapped by Parkinson's disease, his traits of character were again manifested; he accepted it philosophically and continued to teach and conduct research work as long as possible; indeed, long after most persons would have given up. He now goes to his office daily and maintains a keen interest in the affairs of the University, as well as those in the entire field of medicine.

While still a student at the University of Missouri, Dr. Jackson was married to Miss Helen Clarahan, in June 1898 at Harper, Iowa. Their four daughters were reared in a typical American home and became excellent citizens located in four different states. Through all the years—forty-four of them—Mrs. Jackson has contributed greatly to Dr. Jackson's success. She has manifested deep interest in his staff members and their families and has frequently assisted them and supported them in the solution of their problems.

This, in brief, is what the infant born on April 12, 1875, held in store for the world. His ability as a teacher, investigator, and administrator; his fine contributions to the literature; his unquestioned character; his honesty, truthfulness, and trustworthiness in every respect, together with the absence of any manifestation of jealousy or selfishness, have won for him a place among America's truly great physicians of all time.

LOWER TUBERCULOSIS MORTALITY

There is no good reason why the United States should not show a death rate from tuberculosis of 25 per 100,000, by 1950, believes Dr. Louis I. Dublin, third vice-president and statistician, Metropolitan Life Insurance Company, New York City. Instead of more than 25 per cent of the population reacting to tuberculin, the ratio should be only 10 to 155 in the next decade.

REALISTIC FIRST-AID TRAINING

American first-aiders are committing the same blunders that the British did—they fail to examine patients carefully enough; they pay attention only to the worst injury; they use splints that are too short; they incline to be too free with the tourniquet. An editorial in a recent issue of the British *Lancet* calls for more realistic instruction of first-aiders. First-aid students should be given examples of problems they will be called upon to handle rather than long lectures on anatomy. The skill and conscience of a first-aid lecturer may mean the difference between the survival and death of somebody and, if invasion comes, the efficiency of first-aid workers may turn the scale.

Some Problems of the College Health Service in a Nation at War*

Ruth E. Boynton, M.D.†
Minneapolis, Minnesota

THIS is the first time in the history of this Association that we have been confronted with the problems which a country at war brings to a health service program. Now that we have recovered from the first shock of being at war it is obvious that changes must be made in the college health program, as they are being made in all other fields to meet the emergency. A curtailment of certain parts of the program will be necessary because of decreased student enrollment, decreased budgets and a decrease in staff. On the other hand, there will be new responsibilities which must be assumed if we, as a college health group, are to do our part in the defense program.

One might think that the experience of colleges and universities during the first world war would give us rather definite indications of what we might expect in college enrollment at the present time. We can, however, obtain little helpful information because of the fact that in the fall of 1918 the War Department set up the Students Army Training Corps in practically every college and university. This Students Army Training Corps placed every male student over 18 years of age enrolled in the college or university under the direction and discipline of the War Department. The students received thirty dollars a month pay from the United States Army; they lived under strict army discipline in barracks; their uniforms, housing and subsistence were paid for by the government; and they were supposed to follow a military and academic course prescribed by the War Department. The setting up of the S.A.T.C., therefore, on the whole increased rather than decreased college enrollment. At the University of Minnesota, for example, the total college enrollment for the year 1918-19 was 20 per cent above that of 1917-18 and 10 per cent above that of 1916-17. Young men enrolled in our colleges were allowed to remain there as members of the Students Army Training Corps.

That this experiment of the Students Army Training Corps was not successful was readily agreed upon by both military authorities and college and university administrators. The men were neither soldiers nor students. Dr. Marion LeRoy Burton, who was President of the University of Minnesota at that time, stated in his annual report: "That the results of the S.A.T.C. were far from satisfactory, everyone who was associated intimately with the enterprise will promptly concede. In a word, a true university cannot be a military camp. The underlying spirit of an institution of higher learning is freedom. It is a place where scholars seek for the truth. A military camp is a synonym for obedience and strict compliance with orders. The program of work was too heavy for the average student. The combination of military drill, requiring 11 hours each week, with a heavy academic schedule, proved unfortunate. Military duties constantly interfered with academic responsibilities."

I think it is safe to assume that no similar experiment will be tried in this war. With the draft age set at 20 years and the apparent increasing need for men in the Army and the Navy, it can be assumed that there will be a decrease in enrollment in men's colleges and coeducational colleges and universities. Time alone will tell how great this decrease will be. For those schools in which the health program is financed partially or entirely from students' fees, this decrease in enrollment will mean, obviously, a decrease in the budget which will necessitate some rearrangement of the programs and services provided for students.

Another problem which will face the college health service is that of providing adequate medical staff. We all know that with an enlarged army and navy there is going to be a need for additional medical personnel in all branches of the military service. We may expect that some of our physicians in college health work will be called for these services. However, an attempt is being made through the Procurement and Assignment Services under the office of Health, Welfare and Related Defense Activities to utilize the medical and dental personnel of the nation in the most efficient way possible. It is to be the function of this Procurement and Assignment Service to assist in the selection of physicians for military and civilian needs and thus prevent, so far as possible, the crippling of essential medical service anywhere in the country. I remember in my own student days during the last war when the only physicians available for the Health Service staff were a professor of anatomy and a professor of pharmacology, neither of whom had had any clinical experience for at least twenty-five years. Some of our college health service staffs have already felt the effects of the military need for physicians. One state university health service director wrote me just a few days ago that he had lost three of the full-time members of his staff to army service within the past month. Therefore, in spite of the best efforts of the Procurement and Assignment Service we must anticipate some loss of professional personnel from our college health staffs for military service.

The increase in the prevalence and mortality of certain epidemic diseases which occurred during the last war may serve as a guide in our planning at this present time. There was a definite increase in the death rate from tuberculosis, measles, meningitis, pneumonia and influenza. While the deaths from these diseases in the army camps were responsible in large part for the increased mortality rates, the civilian population, both in and out of colleges, did not escape. Although much progress has been made in the prevention and treatment of many of these diseases during the past twenty-five years, the possibility of an increase in some of them, even in our college population, must be kept in mind.

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*Presented at the twenty-second annual meeting of the American Student Health Association, New York City, December 30-31, 1941.

†Students' Health Service, University of Minnesota, Minneapolis, Minnesota.

Tuberculosis case-finding programs must be continued and improved. Provision must be made to care for large numbers of students with influenza, whether it be the mild form seen during the past few years, or a recurrence of the severe type which occurred during the 1918 pandemic. We must be ready to make available to our students any influenza vaccine which gives promise of providing protection. And all of the usual measures to prevent the spread of disease in large groups living closely together must be meticulously carried out.

Despite decreased college enrollment and curtailed staff, it seems there are at least three definite responsibilities which the college health service must assume in the interests of better national preparedness. First, there probably should be some rearrangement or reëmphasis in our health teaching program. The college hygiene faculty can offer its services to the American Red Cross to provide an extension of first aid classes for the college population. The potential need of large numbers of people versed in first aid is evident. The college has a real responsibility to make provisions so that every student may obtain at least elementary first aid training. Another need which is being emphasized is an extension of teaching in home nursing and care of the sick. This again is being promoted by the Red Cross, under whose direction plans are under way to provide extensive training in this field throughout the country. Because of the shortage of graduate nurses and the probability that large numbers of women will have to assume more of the responsibility for the care of the ill in the home, as well as in the hospitals, this training in home nursing is an essential part of our health teaching at this time. Another contribution which can be made by the college hygiene teacher is to provide adequate instruction in the field of nutrition. Most of us have been attempting to do this for many years. During the past year, however, increasing emphasis has been placed upon the importance of nutrition to the welfare of the nation, particularly a nation at war. Our college students should be well informed about all of the scientific advances which have been made in the field of nutrition so that they may go out as community leaders, intelligent of the needs.

A second additional responsibility which every college health service must assume, if called upon, is to assist in the physical examination of men for the military service. During the past year many of our health services have made generous contributions of time and staffs for this purpose, but if the experience of the first world war is any indication, I think we may expect to be asked to give even more assistance to the examining boards in the various communities.

The third additional responsibility is to do what we can to rehabilitate the college student in whom physical defects are found at the time of the periodic health examination. There has been much interest in the prehabilitation of the men found physically unfit for army service, and I hope that we shall hear more about this from Dr. Rowntree this noon. The colleges, in my opinion, should not restrict their interest and effort in rehabilitation of students, to men who may go into army service. The health and welfare of the people of this country depend on having women as well as men free from physical defects and in the best possible health.

We in college health services find ourselves in a somewhat paradoxical position. We will in all probability be called upon to make certain retrenchments due to restricted budgets and staffs, but at the same time the emergency calls for intensified effort in maintaining the health of the student body and even in taking on new services particularly related to the war. The college health group must accept the challenge for protecting and maintaining health as their part in America's total war effort.

BLOOD DONATIONS INCREASE

Blood donations to the Army-Navy plasma supply have increased 100 per cent since the Japanese attacked Pearl Harbor on December 7, but hundreds of thousands more still are needed to meet the requirements of the United States armed services, the American Red Cross headquarters in Washington, D. C., report.

BLOOD PLASMA FOR CIVILIANS

Dried blood plasma will be made available to civilians in limited amounts through the Red Cross at points in the United States vulnerable to enemy attack, reports Chairman Norman H. Davis, of the Red Cross, as the result of a recent consultation with the Office of Civilian Defense and the Surgeons General of the Army and Navy. The plasma will be handled by the disaster relief organizations of the Red Cross, and is being issued through medical channels jointly determined by the Office of Civilian Defense.

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MINNEAPOLIS, MINN., APRIL, 1942

CONTENTS AND CONTRIBUTORS

This issue of the JOURNAL-LANCET, introduced by Dr. Kendall Emerson, Managing Director of the National Tuberculosis Association, contains a number of articles on tuberculosis. For many years, during the month of April, the National Tuberculosis Association has sponsored an Early Diagnosis Campaign throughout the nation and in recent years the April issue of the JOURNAL-LANCET has been devoted largely to tuberculosis in an attempt to aid in the great national campaign.

The eleventh annual report of the Tuberculosis Committee of the American Student Health Association was prepared by Dr. Charles E. Lyght of Carleton College. Nowhere in the literature is there to be found a more sound and logical discussion on tuberculosis. Dr. Lyght presents the various procedures employed in diagnosis, such as the tuberculin test, X-ray film inspection of the lungs, and clinical and laboratory methods, in a straightforward manner. He does not mince words in pointing out that no single phase of the examination, such as the X-ray, is adequate but that every phase of the examination must be included. Nowhere in the nation has there been a finer opportunity to study tuberculosis among young adults than in our colleges and universities and nowhere has greater advantage been taken of the opportunity than by the Tuberculosis Committee under the leadership of Dr. Lyght. In fact, in the school year 1940-41, 304 American colleges and universities participated in special tuberculosis activities. If the program here presented by Dr. Lyght were extended to the entire nation and conducted as he recommends, tuberculosis would soon become a minor disease.

Pleyte and Holand have visualized the future needs in tuberculosis control in diagnosis, treatment and prevention. They emphasize the opportunities and obligations of the family physician.

Weinerman and Coe call attention to what now appears to be the most serious problem in the field of tuberculosis, namely, the transmission of tubercle bacilli from patients to students of nursing and medicine and interns. They review the voluminous literature on this subject and recommend a program which, if put into effect in all hospitals and sanatoriums, would for the most part solve the problem.

Dr. Kathleen Jordan presents her personal observations on tuberculous infection occurring in high schools. She cites a number of cases which emphasize the contagiousness of this disease. During the past decade Dr. Jordan has examined many thousand school children, which entitles her to speak with great authority on this subject.

Collins, formerly of the clinical staff of the Chicago Municipal Sanitarium, calls attention to the fallacy of omitting the tuberculin test and proceeding directly to the X-ray film inspection of the lungs. He shows that the tuberculin test is highly specific, whereas, the X-ray shadow does not provide one with an accurate means of determining etiology. He laments the fact that those in charge of the examinations for entrance to military service have omitted the tuberculin test and calls attention to errors based on X-ray film inspections which have resulted in the rejection from the army of non-tuberculous persons. There can be no doubt that great injustice will be done to large numbers of persons as well as the military service, itself, or any other group or organization that depends for diagnosis of tuberculosis on X-ray film inspection, alone. Collins presents an ideal plan which is practical in every sense of the word for the control of tuberculosis in military service.

Pérez of Argentina makes a worthwhile contribution in pointing out how frequently tuberculosis of the lungs is accompanied by lesions in the tracheobronchial tree, thus explaining why so many persons with pulmonary tuberculosis do not become symptom-free following collapse therapy.

The Journal-Lancet is pleased to have the opportunity to present to its readers this group of papers prepared by recognized experts in the field of chest diseases.

J. A. M.

MARCHING TO HEALTH

On your feet, America! That's the command not only to those of military age but to the whole nation. The necessity of rationing gasoline and rubber may prove a blessing in disguise to a large share of our civilian population. These people can now rise and walk themselves back to health and respectability.

We must not talk about our nation being soft. That is negativism and unpatriotic slander. We must talk about our strength, our capacity for work and how to increase our efficiency. If we do a little more walking, we will lose the jitters and insomnia on which we have expended so much for sedatives in the past. And while we are on the subject of rationing, let us not forget that there is something sweeter than sugar and that is this way of life for which we are now so earnestly fighting.

A. E. H.

TUBERCLE BACILLI IN THE DIGESTIVE TRACT

For a long time it has been known that tubercle bacilli may be recovered from the dejecta of tuberculous persons and animals. Such workers as Cadéac and Bournay writing in 1895, and numerous others since that time, assumed that the organisms reach the digestive tract through the swallowing of sputum, the ingestion of tuberculous material or tuberculous lesions in the intestine. However, in 1907 Rosenberger and others found that tubercle bacilli were eliminated by way of the intestine in a good many persons who had miliary tuberculosis and other so-called closed forms of the disease. Indeed, in 1910 Alexander reported that in examination of fecal specimens tubercle bacilli were found fifty-two times in seventy-four persons with tuberculous meningitis, miliary disease, pleurisy, lymph nodes and bones and joints. These persons did not have open tuberculosis or were the bacilli consistently found in the fecal specimens. He observed that when cholagogues were administered the organisms were more likely to be recovered. The same year Philip and Porter found that in forty-two persons with pulmonary tuberculosis in whom tubercle bacilli could not be recovered from the sputum, twenty-nine eliminated them by way of the intestine. Thus, the question arose as to whether tubercle bacilli always enter the digestive tract through the esophagus.

In 1909 Calmette and Guerin proved experimentally that tubercle bacilli can be eliminated through the bile. They injected organisms into the veins of rabbits and three days later recovered them from the gallbladder. They next conducted similar experiments on cattle and proved beyond doubt that tubercle bacilli reach the intestinal tract by way of the bile. Other workers have since shown that in cattle and swine affected with generalized tuberculosis, organisms are eliminated by way of the bile passages in 25 per cent or more. Indeed, Titze and Jahn found tubercle bacilli in the bile of 42.3 per cent of tuberculous cattle and goats even though the lesions were not extensive and in some of the animals they were limited to lymph nodes. Therefore, it has been proved conclusively that tubercle bacilli frequently reach the intestinal tract by way of the bile even though tuberculous lesions do not exist in the liver.

Although it is not a new procedure, seeking tubercle bacilli in the gastric contents has been revived and used extensively in recent years. The person to be examined reports without having taken breakfast and is given 200 to 300 cc. of water. This is soon removed from the stomach, centrifuged, and the sediment examined for tubercle bacilli. The finding of acid-fast organisms is not sufficient, as there are numerous non-pathologic acid-fast bacilli in Nature which under the microscope have the same appearance as tubercle bacilli. Therefore, one must resort to culture methods or animal inoculation. When tubercle bacilli are recovered, one must not immediately conclude that they are derived from a pulmonary lesion from which they reached the pharynx and then the stomach by way of the esophagus. It has long been known that bile is frequently found in the stomach and since tubercle bacilli are often eliminated by way of the bile this source must always be considered.

The finding of tubercle bacilli in the gastric contents does not necessarily indicate a progressive tuberculous lesion in the lung. Indeed, one may find them in some cases in which there is no evidence of disease except calcium deposits revealed by X-ray film inspection of the chest and, again, in cases where even this much evidence is not present. One must constantly realize that it is not at all impossible for a tuberculous lesion (even of a primary complex) of long standing and apparently well controlled to occasionally shed tubercle bacilli. Thus, from both pulmonary and extrathoracic lesions they may be eliminated by way of the bile and be recovered from the gastric contents.

When the tuberculin reaction is present one knows that living tubercle bacilli are present although the location of the lesions may not be demonstrated during life. Therefore, the finding of tubercle bacilli in the gastric contents provides no additional information with reference to the presence of tubercle bacilli. Many persons who have had adequate and successful treatment have been refused employment or have been discharged from their positions because tubercle bacilli have been found in their gastric contents. Often this is an injustice as there is little or no evidence that they transmit their bacilli to others or that work harms them. It is more than probable that many tuberculin reactors who have never had clinical tuberculosis, eliminate tubercle bacilli from time to time which could be recovered from the feces or even the gastric contents if one searched sufficiently long and carefully for them.

J. A. M.

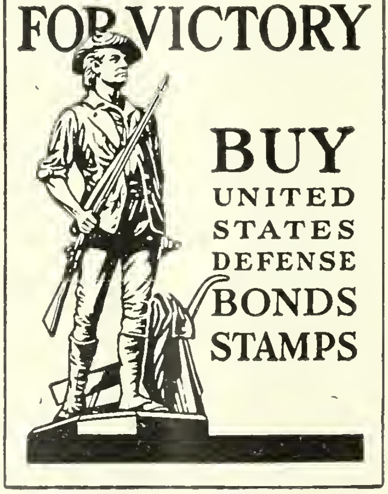
DEFENSE SAVINGS

In this world conflict in which we are fighting for the preservation of our nation, our ideals, and our way of life, physicians and surgeons are called upon for increased professional service. Not only is this true for our members serving the armed forces. Those of us who remain on the home fronts must assume additional responsibility for the care of private and clinic patients. At the same time, we must share the obligations of all civilian forces. One important duty for us as a united people is to provide the money for the greatest war program that America has ever put into effect.

Months before Pearl Harbor, the Treasury Department initiated the Defense Savings Program. Through this, the Government sought to secure loans directly from the people to help finance our Defense Program. Now the nation is engaged in total war. We can and we must put all of our resources into this national war effort. This means not only the service of our people and the material goods of the nation, but all our financial resources, as well. And we as individuals must carry our share of the responsibility.

We do provide a part of the money in tax payments. But a large portion of the total, we must invest voluntarily through the purchase of war securities—*United States Savings Bonds and Stamps.* These loans to the Government may be made in sums as small as 10 cents and as large as $10,000. Regardless of the denomination of our purchases, it is our obligation to buy and continue to buy to the maximum of our ability.

By investing our money in United States Bonds, we as individuals, help in the war effort; we assist in the nation's fight to curb inflation by putting our money into war securities rather than every-day goods; and at the same time, we build toward our own personal security.



Future Meetings

NORTH DAKOTA STATE MEDICAL ASSOCIATION

1942 Meeting

Jamestown, May 18-20

The North Dakota State Medical Asociation annual meeting will be held in Jamestown May 18, 19 and 20. The House of Delegates and the State Health Officers Association will meet on Monday, May 18. The scientific sessions of the State Association will be held on Tuesday and Wednesday, May 19 and 20. The program has not been completed but will include the following features:

Obstetrics—by Dr. Ralph Reis, Chicago.

Pediatrics—by Dr. Erling Platou, Minneapolis.

Fractures—by Dr. Stanley, Maxeiner, Minneapolis.

Symposium on Nervous and Mental Diseases at the State Hospital, to be conducted by Dr. Gordon Kamman, St. Paul.

Symposium on Encephalitis in which Drs. Rosenow of Rochester, Minnesota, and Herald R. Cox, U. S. Public Health Service Laboratory, Hamilton, Montana, will participate.

Glaucoma—by Dr. G. M. Constans, Bismarck.

"The Symptom of Headache"—by Professor Boies, University of Minnesota.

"The Role of the General Practitioner and the Solution of the Problem of Gastric Carcinoma"—speaker to be announced later.

Several luncheon discussions are planned for Tuesday and Wednesday. The North Dakota Academy of Ophthalmology and Otolaryngology will meet on Tuesday, May 19.

SOUTH DAKOTA STATE MEDICAL ASSOCIATION

PRELIMINARY ANNOUNCEMENT

Annual Meeting, Sioux Falls, May 13-15, 1942

The inter-allied council representing the physicians', pharmacists', dentists', hospitals' and nurses' associations, have set May 13, 14 and 15 for the forthcoming convention. Each profession will have their own separate program of activities with the afternoon and evening of May 14 for the joint sessions. Speakers for the afternoon joint session will be: for the medical profession, Dr. Irving S. Cutter; for the nurses' association, Sister Berenice, Dean of Nurses, Marquette University, Milwaukee; for the hospitals, Dr. Malcolm T. MacEachern, Associate Director, American College of Surgeons; for the dentists, Dr. T. T. Molt, Chicago; and for the pharmacists, Dean E. R. Searles of Chicago, formerly of State College Pharmacy School, Brookings. Our joint banquet and entertainment will take up the evening.

For the professional program of the medical association, the following is planned:

Thursday morning, "The Treatment of the Patient Over Fifty"—Edward L. Tuohy, M.D., Duluth, Minnesota. "Shock Treatment in Mental Disease. Insulin, Metrazol and Faradism" (illustrated by movies)—Dr. Hewitt B. Hannah, Minneapolis.

Friday morning, "Common and Obscure Skin Diseases" (illustrated by colored films)—Dr. S. E. Sweitzer, Minneapolis. "X-ray Diagnosis" (demonstrated with films)—Dr. Leo G. Rigler, Minneapolis.

Friday afternoon, "Discussion of Iron, Liver Extract and Vitamins in the Treatment of Various Types of Anemia"—H. Z. Giffin, M.D., Rochester. "Abdominal Pain and Its Local Significance"—Arnold Schwyzer, M.D., St. Paul.

The business sessions of the medical association will be held principally on Wednesday, May 13. Headquarters for the medical association have been set at the Hotel Carpenter. In view of the five associations meetings, hotel and room reservations should be made early. Arrangements have been made to supplement hotel accommodations with rooms in private homes, should it be necessary.

Clarence E. Sherwood, M.D., Secretary.

Book Reviews

Human Anatomy and Physiology, by Nellie D. Millard, R.N., M.A., and Barry D. King, Ph.D.; red cloth, stamped in blue and gold, 285 illustrations (28 in color) by Lucille Cassell; Philadelphia and London: the W. B. Saunders Co., 1941. $3.00.

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The student or worker who has need of a fundamental understanding of anatomy and physiology, but not so complete an understanding of these basic sciences as that required by the practicing physician, can profit by recourse to a text in which the two subjects are presented conjointly. Several such texts are now available. The present one is intended for nurses, and would seem to be particularly noteworthy by virtue of the manner in which the approach to the subject is carried out. So far as is known, such an approach has never been utilized before in a work of this nature: the volume has five main divisions, to which all other considerations, physiologic and anatomic, are subordinated. These divisions (or "units", as they are called by the author) are (1) the body as a whole, (2) the erect and moving body, (3) maintenance of the metabolism of the body, (4) reproduction of the human body and (5) integration and control of the body by the nervous system. Miss Millard is instructor in anatomy and physiology in the Michael Reese Hospital School of Nursing in Chicago; Dr. King is assistant professor of physiology in the College of Physicians and Surgeons of Columbia University in New York City. Without doubt they have produced a clear, succinct, informative and valuable text, in a field of exposition in which heretofore these qualities have not been abundant.

Roentgen Interpretation, by George W. Holmes and Howard E. Ruggles; 6th edition; 246 engravings. Philadelphia: Lea & Febiger. . . . .

The latest edition of Ruggles and Holmes carries on the tradition established by all precedent issues in bringing a condensed summary of the salient points in roentgen interpretation. As all the other editions, this one will be of service to the practitioner doing casual and occasional roentgenographic interpretation and will at the same time furnish the specialist in roentgenology fundamental data which even the most sophisticated need periodically to be reminded.

The text is clear, as usual; the illustrations are adequate. Statements which, made by others, might be considered to be dogmatic, are in this context rightfully evaluated as condensation.

It appears that Ruggles and Holmes will continue as the definitive work in roentgenology as Osler has in general medicine. Such appraisal is in no way effusive.

Encephalitis, A Clinical Study, by Josephine B. Neal; 563 pages. New York: Grune and Stratton. . . . .

This book represents the result of many years of work by the Matheson Commission for the study of encephalitis. The author, through her association with the commission, has had the unusual opportunity of studying and observing probably a greater number of cases of encephalitis than any other single individual; and she has assembled and recorded the experiences of the commission in a most enlightening manner. Although the title of this work is *Encephalitis*, the largest portion of the book (almost 250 pages) is devoted to a discussion of the lethargic or epidemic encephalitis of Von Economo, with which the author apparently has had the greatest experience. The clinical description of this disease with its course and sequels, the illustrative case reports, and finally the discussion of the present day therapies are most vividlv described and convey a wealth of information.

Modern Americans in Science and Invention, by Edna Yost, with pen-and-ink drawings by Margaret Ayer; orange cloth, stamped in black, 270 pages, no index, no bibliography; New York: Frederick A. Stokes Co.: 1941. Price $2.00. . . . .

Short histories of a number of American workers who certainly deserve honor from their follow countrymen, but who for the most part have remained in obscurity, are presented in this unpretentious work. Of particular interest to those engaged in the practice of medicine and others interested in medicine are sketches of Dr. Stephen Smith (1823-1822), held by some to be the prime mover in American public health legislation; Dr. William Crawford Gorgas (1854-1920), Harvey Washington Wiley (1844-1930), and Dr. Robert R. Williams (1886-). These names are relatively well known. Names which most readers would find difficult to identify are Ezra Cornell (1807-1874), builder, a founder of the Western Union Telegraph Company, associate of Dr. Samuel F. B. Morse (1791-1872) and founder of Cornell University; John Brashear (1840-1920), lens maker and distinguished astronomer; Ambrose Swasey (1846-1937), who learned to build machine tools so well that he broke the European monopoly on the production of these vital implements of industry; Willis H. Carrier (1876-), the upstate New Yorker of whom it may be said truly that he learned how to manufacture weather; and Dr. Frederick G. Cottrell (1877-), inventor of devices which have conserved vast stores of substances formerly classed as industrial wastes. The book is frankly commendatory in tone, and no attempt at critical evaluation was made by the author, who is an experienced writer, for some years associated with the American Public Health Association and the American Society of Mechanical Engineers. Yet, were scholars in the history of science to charge that the author's sketches are too blandly laudatory in tone, she might very well reply that such a volume as hers has been needed for a long time, and that the scholars have done nothing to satisfy the need. Probably no one would say that the book is not vividly interesting. It is also of value.

News Items

ANNUAL JOURNAL-LANCET LECTURE — UNIVERSITY OF MINNESOTA MEDICAL SCHOOL

Dr. Herald R. Cox, Principal Bacteriologist in the National Institute of Health of the United States Public Health Service will deliver the second annual Journal-Lancet lecture at the University of Minnesota Medical School on Friday, May 22.

The title of his lecture will be "Typhus Fever: with Special Reference to Epidemiology and Immunity." The lecture will be held at 8 p. m. in the Medical Sciences Amphitheatre, Room 15.

Dr. Cox holds the Doctor of Science degree from Johns Hopkins University where he was also instructor in immunology for one year. Thereafter he was an investigator in bacteriology and pathology in the Rockefeller Institute until 1936. Since that time he has worked with the United States Public Health Service and is now Principal Bacteriologist, stationed at the Laboratory in Hamilton, Montana. His work has been confined largely to the filterable virus and related diseases including especially equine encephalomyelitis, Rocky Mountain spotted fever and typhus.

All physicians are invited to attend the lecture.

Dr. Paul Cook has succeeded Dr. R. G. White as state health officer in Valley City, North Dakota. He will have charge of the state health divisional offices supervising the work of six counties. Dr. White has been transferred to Bismarck.

Dr. Linus Leitschuh of Sleepy Eye, Minnesota, who is now in the medical corps of the U. S. Army at Oakland, California, has been promoted from first lieutenant to captain.

Dr. E. R. Crow, Arlington, Minnesota, has joined the staff of the Ah-Gwah-Ching sanatorium near Walker, Minnesota.

New chiefs of staff in Minneapolis hospitals are: Abbott, Dr. Lewis M. Daniel; Maternity, Dr. Jno. A. Haugen.

Dr. Arnold M. Thompson, Sioux Falls, is now serving in the U. S. Army Medical Corps as a First Lieutenant.

Dr. J. H. Garberson, Miles City, Montana, has been appointed chairman of the executive committee of the Montana unit of the American Society for Control of Cancer. The appointment was made by Dr. W. E. Long, Anaconda, state association president.

Dr. Eric Sanderson, of Minneota, Minnesota, formerly resident surgeon at the Boston City hospital, has been commissioned as a first lieutenant in the U. S. Army medical corps.

(*Continued on second page following*)

If you wish to avail yourself of pure vitamin-E therapy in your E-hypovitaminotic patients we suggest that you prescribe Ephynal Acetate. This is the acetic acid ester of pure synthetic vitamin E, made by a process characterized by exclusive Roche refinements. Ephynal Acetate is exceptionally well tolerated and is about 170 times more active than crude wheat germ oil. Chief indications are amyotrophic lateral sclerosis, threatened and habitual abortion, and abruptio placentae.

- Ephynal Acetate is available in oral tablets only, as follows: 3-mg. tablets, bottles of 30 and 100; 10-mg. tablets, bottles of 50 and 250; 25-mg. tablets, bottles of 50.

HOFFMANN-LA ROCHE, INC., ROCHE PARK, NUTLEY, NEW JERSEY

EPHYNAL ACETATE, Synthetic Vitamin E Acetate

Dr. T. J. Bloedel, formerly of Minneapolis where he was a staff member of St. Barnabas hospital, is now practicing in Gaylord, Minnesota.

The Missoula Minnesota Club, composed of graduates of the University of Minnesota Medical school, meets every Wednesday noon in Missoula, Montana. Average attendance is fifteen to twenty physicians. Dr. M. B. Hessdorfer is president.

A series of clinics for crippled children will be held in nine centers serving 41 Minnesota counties in April, May and June. A schedule for the series, held twice annually, was made public recently by Dr. Malvin J. Nydahl, head of the State Bureau for Crippled Children, Division of Social Welfare. Clinics will be held at St. Cloud, Worthington, Austin, Detroit Lakes, Willmar, Thief River Falls, Aitkin, Morris and Grand Rapids. On recommendation of his family physician, any crippled child will be admitted to the clinic for examination.

Dr. D. E. Morehead, Owatonna, Minnesota, is the new president of the Steele County Medical society.

Dr. H. Hiebert, formerly a staff member of the Ah-Gwah-Ching sanatorium, is now in Topeka where he is Director of Control of Tuberculosis, state of Kansas.

Dr. E. W. Cowern, North St. Paul, Minnesota, has retired from active medical practice and moved to Seattle, Washington. Dr. Cowern, 71, was graduated from Dartmouth Medical College in 1902; he came to practice in North St. Paul in 1903.

The Montana Branch of the American College of Physicians met at Missoula, Montana, February 21-22. Papers were read by Dr. Fred Schem of Great Falls, Dr. Herald Cox of the United States Public Health Laboratory, Hamilton, Montana, and Dr. M. V. Hargett, also of the United States Public Health Laboratory. Dr. R. P. Parker, in charge of the U.S.P.H.S. laboratory at Hamilton, conducted an inspection tour of the laboratory and showed how the vaccine for typhis, Rocky Mountain spotted fever, and yellow fever was made. Dr. E. Hitchcock is the governor of the Montana branch of the American College of Physicians and D. A. R. Foss is secretary.

The Minnesota State Medical Association broadcasts weekly at 10:15 o'clock every Saturday morning over Station WCCO, Minneapolis, Station WLB, University of Minnesota, and KDAL, Duluth. Speaker: William A. O'Brien, M.D., Director of Postgraduate Medical Education, Medical School, University of Minnesota. April 4—Progress in Cancer Control. April 11—Cancer of the Breast. April 18—Cancer Diagnosis. April 25—Tumors of Mouth.

Dr. William R. Bagley, Duluth, Minnesota, was elected chief of the medical staff of St. Luke's hospital at the annual staff dinner held recently.

Dr. N. R. Hardy, Minto, North Dakota, is the new president of the Grand Forks Medical society.

Dr. E. G. Hubin, Deerwood, Minnesota, is the new president of the Upper Mississippi Medical society. He succeeds Dr. Hawkinson.

Dr. Grover Hulla, Missoula, Montana, district CCC physician for the past year, has been transferred to Ninth corps area CCC headquarters at San Francisco. He will serve as CCC corps area surgeon.

Dr. S. H. Boyer, Jr., Duluth, Minnesota, has been appointed to the St. Louis sanatorium commission by the county board to succeed Dr. A. E. Olson who has resigned.

On February 6, 1942, Dr. J. A. Myers of Minneapolis presented two addresses before the Pike County Teachers' Institute at Griggsville, Illinois, on the importance of controlling tuberculosis among the personnel of school systems. On February 25 he addressed the annual meeting of the Lutheran Hospital Staff in Fort Dodge, Iowa, on "The Evolution of Tuberculosis in the Human Body." On March 12 Dr. Myers attended a dinner meeting of the Linn County Medical Society at the State Sanatorium in Oakdale, Iowa, and addressed the group on "The Early Diagnosis of Tuberculosis." At a luncheon session of the Rotary Club in Iowa City, he spoke on "Controlling Tuberculosis in a Community."

On March 17 Dr. Myers addressed the Grand Rapids (Michigan) Anti-Tuberculosis Society's annual meeting on "War and Tuberculosis;" and on March 26 he spoke before the Camp Release Medical Society in Madison, Minnesota, on "The Differential Diagnosis of Diseases of the Chest."

Mr. Walter H. Finke, Director of the Division of Social Welfare, St. Paul, Minnesota, announces a heart program for children under the age of 21 years which has been approved by the Children's Bureau, Washington, D. C., and is now ready to be set in operation. This program is to be a function of the Bureau for Crippled Children of the Division of Social Welfare. Special emphasis will be placed on children with rheumatic heart disease who are in need of convalescent care.

Because of limited funds, only patients from rural Hennepin, rural Ramsey, Carver, Scott, McLeod, and Dakota Counties will be accepted for care. Children needing convalescent care or acute cases needing hospital care will be hospitalized at the Children's Hospital in St. Paul, where special provision has been made for these cases. A weekly out-patient clinic will be held on Friday mornings at Children's Hospital.

Dr. Malvin J. Nydahl, Head of the Bureau for Crippled Children, is pleased to announce that Dr. Paul Dwan, pediatrician, who has had a great deal of experience in rheumatic heart disease, will perform the clinical work of the heart program.

Applications for this care should be made to the Bureau for Crippled Children, Division of Social Welfare, Globe Building, St. Paul, Minnesota. Any physician from the designated counties wishing to refer a patient for this needed care can do so by writing to the above address.

The JOURNAL LANCET

Minneapolis, Minnesota
May, 1942

Vol. LXII, No. 5
New Series

Prothrombin Deficiency in the Newborn as Affected by Vitamin K and by Prelacteal Feeding*

L. F. Richdorf, M.D.
Minneapolis, Minnesota
William Kearney, M.D.
El Paso, Texas

THE importance of prothrombin deficiency as a cause of hemorrhagic disease of the newborn, and its possible relation to intracranial injuries has been suggested by many writers. The cause of this deficiency is most probably due to a combination of a *poor storage of prothrombin in the fetal liver and an absence of bacterial action in the newborn's gastrointestinal tract.*[1,2]

In reviewing the literature on this subject, conflicting findings and opinion are noted. Certain factors are responsible for these differences. The difficulty in obtaining blood samples each day has resulted in many individual methods of determining prothrombin time, with a varying degree of error. Possible *seasonal variations,* [3,5,6,8] and a *maternal diet deficient in vitamin K,*[2] have been suggested. *Variation in feeding technic* during the newborn period will certainly vary the results.[2] Lastly, the selection and size of the individual series of cases has been a factor in resultant variations. For these reasons, we feel that further findings should be presented in an effort to clarify certain aspects of this prothrombin deficiency in the newborn.

Our purpose in these experiments, then, has been many-fold: (1) to aid in determining a normal expectation of prothrombin deficiency; (2) to attempt to correlate the prothrombin time to actual hemorrhage in the newborn; (3) to study the effect of certain extraneous factors on the prothrombin; (4) to present a method of preventing and treating this deficiency; and (5) to mention miscellaneous findings occurring during the course of our experiments.

METHOD OF INVESTIGATION

Prothrombin times were determined by the micromethod of Kato.[4] The results are expressed in terms of percentage of normal, that is:

$$\text{Prothrombin time} = \frac{\text{Control Pt'}}{\text{Infant's Pt'}} \times 100.$$

Rabbit's brain resulting in a control reading of 18 to 24 seconds was used as the thromboplastic substance. These rapid readings perhaps will result in a greater degree of technical error, but seemed necessary if a micro-method was to be used. The control prothrombin was determined each day.

All infants in this series were of a weight between 2800 and 4000 grams. Extraneous factors were introduced as follows:

In Group I a total of 11 infants were followed. These infants were given water twelve hours following birth and were placed on breast feedings five times daily beginning with the sixteenth hour.

Group II consisted of 15 infants fed water after twenty-four hours, and breast feedings were then started at 48 hours. This group is mentioned as the starvation group.

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*From the department of pediatrics, University of Minnesota.

Group III, consisting of 10 infants, received 5 per cent Casec in the following amounts: four hours—½ ounce; eight hours—¾ ounce; and twelve hours—1 ounce. Breast feeding was instituted at sixteen hours, and five times daily thereafter. Casec was continued as a supplementary feeding until the supply of breast milk was well established or, usually, until the third or fourth day.

In Group IV, consisting of 11 infants, the feeding schedule was the same as in Group III, with the use of 5 per cent Solution Casein Hydrolysate (Amigen of Mead Johnson Co.).

Group V had the same feedings as Groups II and IV, with 15 infants receiving 25 per cent Mull-Soy.

Group VI included 10 infants that received 1 cc. of a synthetic vitamin K preparation intramuscularly. The preparation used was a 4-amino-2-methyl-1-naphthol hydrochloride having a vitamin K activity of 1 mgm. per cc.

RESULTS

1. Studying the first five groups as a whole, that is, excluding those infants receiving vitamin K, we probably approach a normal newborn expectation of prothrombin deficiency. This group includes 62 infants with a total of 254 determinations.

The prothrombin curve in this series generally agrees with that observed by others.[3,7,8,9,10,11,12] During the first day, varying with the actual age of the infant, the prothrombin was found to approach a normal level. Toward the end of the first day the percentage of prothrombin decreased rapidly, and this trend extended into the second and third days. On the fourth and fifth days the amount of prothrombin increased and approached normal levels again.

In a few instances the lowest percentage of normal for the individual occurred on the fourth and fifth days, but usually this low was found on the second and third days. Cases have been reported of hemorrhagic disease occurring in utero,[12] but we cannot confirm these results from this series. On no occasion was the deficiency of the first day as great as on succeeding days, and in no instance did the prothrombin time approach a level that we considered critical during the first day.

In one infant a prothrombin time of 26 per cent of normal was found, and several others were in this general range. However, no untoward results were noted. Just what this deficiency must be before an actual hemorrhage occurs is not known. Certainly, in normal infants that have not undergone severe birth trauma, it seems that readings of 50 per cent of normal are not cause for undue alarm.

2. *Relation of early feedings to prothrombin deficiency.* In the starvation group we find a definite prolongation of prothrombin time beyond the normal level.[2] The findings on the first day coincide with the other groups, but there is evidence of a greater deficiency on the second, third, fourth and fifth days. In addition, many readings fell below 50 per cent of normal (the assumed potential danger point).

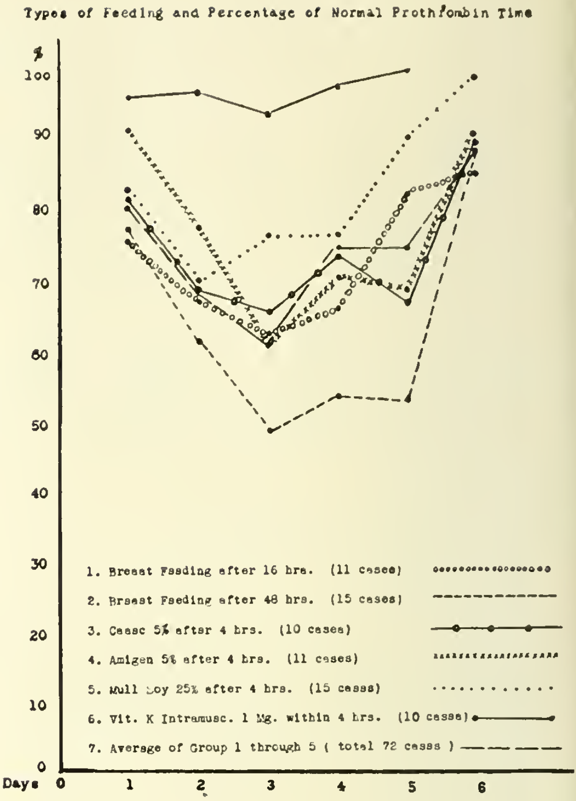

Fig. 1.

In relation to this series it was noted during the course of the experiment that infants with marked prothrombin deficiency often had a poor feeding history. This starvation may well be an etiological factor in some cases of hemorrhagic disease of the newborn.

3. *Effect of pre-lacteal feedings on prothrombin deficiency.* All three types of pre-lacteal feedings used had a favorable effect on the prothrombin times.[2] Generally, the early feeding prevented the marked prothrombin deficiencies which were seen in the starvation group.[2] Again, when marked deficiency occurred there seemed to be a relation to the amount of feeding taken and retained. It was difficult and, in some instances, impossible, to feed each infant the prescribed amount of pre-lacteal food, and this factor has not been correlated in our findings.

The prothrombin times in the groups fed Casec and Amigen were very similar. In the group fed Mull-Soy the deficiency was less marked, and only one infant had a prothrombin time of less than 50 per cent of normal. As a possible explanation of this variation, as all other factors were equal, we have suggested a possible vitamin K content in Mull-Soy. At present this has not been confirmed by biological assay.

4. *Effect of 1 mgm. 4-amino-2-methyl-1-naphthol hydrochloride.* In this group of infants there was no

appreciable increase in the prothrombin deficiency during the first six days of life.[2] Only one reading in the entire group was below 90 per cent of normal. The amount used seemed sufficient in all cases, and no indication for repetition of the drug on subsequent days was found.

In view of the time of the appearance of prothrombin deficiency, and the efficiency and rapid action of vitamin K, it would seem that this method of administration would be in most instances the method of choice for prophylactic use. (It is most probable that the use of vitamin K is beneficial only in preventing intracranial hemorrhage on the second or third day, or at the time a prothrombin deficiency exists.)

5. *Effect of 1 mgm. 4-amino-2-methyl-1-naphthol hydrochloride in the treatment of hemorrhagic disease of the newborn.*

One infant with definite hemorrhagic disease of the newborn was followed during this series.

Case Report

Baby C, feeding at age of 80 hours, was found to have a constant oozing of blood from the umbilical cord and, in addition, had gross hematuria and a profuse melena. At this time the infant's prothrombin time was over 5 minutes and the control was 20 seconds. One mgm. of vitamin K preparation was administered intramuscularly. Prothrombin times were as follows:

	Time	Control	Infant	Remarks
4/ 7/41	9:00 A. M.	20	Over 5 min.	1 mgm. K, IM
	11:15 A. M.	20	39	
	2:00 P. M.	20	22	bleeding controlled
4/ 8/41		23	24	
4/ 9/41		21	22	
4/10/41		21	23	

All evidence of hemorrhage disappeared within two hours after the administration of vitamin K.

Summary and Conclusions

1. Newborn infants have variable degrees of prothrombin deficiency. This deficiency manifests itself on the second, third and fourth days of life.

2. This deficiency was increased by withholding food from the newborn, and in some instances a marked prolongation of the prothrombin time was noted. The possibility of this feeding factor as an etiological agent in the cause of hemorrhagic disease of the newborn was mentioned.

3. The use of pre-lacteal feedings had a favorable influence on the prothrombin deficiency. It was impossible to maintain a normal prothrombin time by use of pre-lacteal feedings alone, but marked prolongations into the critical zone were not noted in these groups.

4. Infants receiving 1 mgm. of a synthetic vitamin K preparation intramuscularly within four hours after birth maintained normal prothrombin times throughout the first six days of life. This amount was sufficient in all cases, and administration in this manner would seem to be the method of choice.

5. One infant with hemorrhagic disease of the newborn was treated with 1 mgm. of synthetic vitamin K. The prothrombin time returned to a normal level within two hours and remained at this level through the seventh day.

Bibliography

1. Snell, A. M.: J.A.M.A. 112:1457 (Apr. 15) 1939.
2. Salomonsen, L., and Nygaard, K. K.: Acta Paediat. 27:209 (Dec. 30) 1939.
3. Waddell, W. W., Jr., and Lawson, G. McL.: J.A.M.A. 115:1416-1421 (Oct. 26) 1940.
4. Kato, K.: Am. J. Clin. Path. 10:147, 1940.
5. Astrowe, P. S., and Palmerton, E. S.: J. Pediat. 18:507 (Apr.) 1941.
6. Kove, S., and Siegel, H.: J. Pediat. 17:448 (Oct.) 1940.
7. Quick, A. J., and Grossman, A. M.: Am. J. Med. Sc. 199:1, 1940.
8. Quick, A. J., and Grossman, A. M.: Proc. Soc. Exper. Biol. & Med. 41:227 (May) 1939.
9. Nygaard, K. K.: Act. Obst. et Gynec. Scandinav. 19:361, 1939.
10. Owen, C. A., Hoffman, G. R., Ziffren, S. E., and Smith, H. P.: Proc. Soc. Exper. Biol. & Med. 41:181, 1939.
11. Waddell, W. W., Jr., & Querry, DuP., III.: J.A.M.A 112:2259 (June 3) 1939.
12. Dam, Heinrick, Tage Hansen, E., and Plum, P.: Ugesk. f. laeger 101:896 (Aug. 3) 1939.
13. Javert, C. T.: Am. J. Obst. & Gynec. 40:453 (Sept.) 1940.

NOTES: Synkamen, a Parke, Davis & Co. preparation, was used as vitamin K.
Amigen, a Mead Johnson & Co. product.
Mull-Soy, supplied by Muller Laboratories.

Pleurisy with Effusion as a Manifestation of Rheumatic Fever

Arild E. Hansen, M.D.

Minneapolis, Minnesota

A STUDY of the admitting diagnoses made by physicians who had referred children wtih rheumatic fever to the University of Minnesota Hospitals[1] revealed that when joint pains or chorea were present the diagnosis was correctly made in a high percentage of cases; however, when the more unusual manifestations of the disease occurred, the diagnosis of rheumatic fever was less likely to be made. The difficulty which may arise in making the correct diagnosis when the less common manifestations, such as pneumonitis and pleuritis, are present was well illustrated by a patient at the University of Minnesota Hospital who developed a recrudescence, the main feature of which was pleurisy with effusion. The purpose of this report is to present in more detail the clinical picture of this case and to discuss this manifestation of rheumatic fever in relation to the general problem of pleural effusion as well as again to emphasize the protean symptomatology of this disease.

CASE REPORT

B. W., a 12 year old boy, was admitted to the University Hospital on August 24, 1939, because of a polyarthritis which had begun in July of the same year. He had had the usual childhood diseases with no complications, and four years previously, his tonsils and adenoids had been removed because of frequent sore throats. One brother had suffered an attack of rheumatic fever five years before, and his father had been in a tubercular sanatorium for ten years. On examination the boy seemed to be fairly well developed and nourished, was bright, coöperative, and free from pain. There was a definite systolic murmur at the apex which was transmitted to the axilla. Roentgenograms revealed slight enlargement of the left auricle and right ventricle. E.K.G. showed: rate 115, axis +65°, prolonged conduction time to 0.20, shifting pacemaker, slurring QRS_1 and $_3$, notching of P_1 and $_4$ and an occasional Swift T_2. The child had a low grade fever to 101° (rectal temperature) for the first five days in the hospital. The leucocyte count was but 7,300 and the hemoglobin 70 per cent. However, the sedimentation rate was: 15 min.—12 mm., 30 min.—56 mm., 45 min.—65 mm., and 60 min.—81 mm. The Weltmann reaction was 4. The venous pressure was 6 cm. in the right cubital vein; the circulation time was, arm to tongue 12 seconds, and arm to lung, 5 seconds. The tuberculin test was positive and was explained on the basis of a calcified Ghon tubercle at the right base just beneath the dome of the diaphragm. The final diagnosis was: (1) acute rheumatic fever, rheumatic polyarthritis, rheumatic myocarditis, mitral regurgitation; and (2) healed primary tuberculosis. As the rheumatic infection was still active, the child was sent home on September 3 for prolonged rest in bed.

On September 21 the child was readmitted to the hospital because of unsatisfactory progress, due, in part, to the poor home environment. The pertinent findings of the recrudescence which occurred during this stay in the hospital are summarized by the chart in Figure 1.

The development of a sudden febrile episode with pleural effusion as noted in the accompanying chart seemed indeed unusual and at first it was felt that a pneumonia was developing. When the effusion became apparent, it seemed imperative to rule out tuberculosis in view of the family history, positive tuberculin reaction, and the presence of a calcified Ghon tubercle. A diagnostic thoracentesis was performed on October 11 and 6 cc. of cloudy greenish fluid were removed from the pleural cavity. This fluid showed no organisms, either on direct smear or on culture. The next day (October 12) because of dyspnea when the patient was lying down as well as pain in the chest, 250 cc. of pleural fluid were removed. This material was grossly sanguineous and coagulated on standing. Bacteriologic studies made at both the University Hospital and at the State Board of Health Laboratories failed to reveal any organisms, acid-fast or otherwise, on direct smear or on culture. In addition to these observations and those recorded in Figure 1, the following data were obtained: blood cultures (September 23 and October 10), no growth; throat culture (October 11), streptococcus viridans; gastric washings (October 17 and 24), no tubercle bacilli demonstrated on direct smear, culture, or animal inoculation. The periodic roentgenograms shown in Figure 2 present a picture of the clinical course of this rheumatic pleural effusion. A remarkable feature of this case was the prompt cessation of symptoms which followed this recrudescence. The patient was discharged on November 14 and advised to continue with bed rest. A report the next spring stated that he had experienced no further recurrences that year.

DISCUSSION

The occurrence of pleural effusion as a recrudescence of rheumatic fever in this case demonstrates that not only must we realize when such a condition is encountered in a child that rheumatic infection may be one of the causes, but also that we must be familiar with all the varied manifestations of rheumatic infections in order to facilitate proper diagnosis and treatment of this condition in children. A brief review of the types of pleural effusions may be useful in our recognition of those which might possibly be associated with rheumatic fever. These effusions may be classed as follows:

Purulent (empyema)

Undoubtedly the most frequently encountered type of pleural effusion in childhood is that associated with or following pneumonia (pneumococcus, streptococcus, staphylococcus and others). This type may also occur with sepsis (staphylococcemia, streptococcal infections) as well as acute infectious diseases such as scarlet fever, infrequently with acute rheumatic fever. Tuberculous pleural effusion is not common in childhood in this part of the country. Very occasionally pulmonary abscess, foreign body, bronchiectasis, and mediastinal abscess may have a purulent effusion, whereas a persistent empyema may often be due to the presence of an infected lung cyst. One 12 year old boy at the University Hospital had repeated accumulation of straw colored to greenish tinged fluid which was always sterile on culture. Subsequently he was found to have actinomycosis, showing that fungus infections may also produce pleural effusion.

Serous and serofibrinous

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*From the department of pediatrics, University of Minnesota. (Assistance in the preparation of these materials was furnished by the personnel of the Works Projects Administration, the official project number 165-1-71-124, sub-project number 254.)

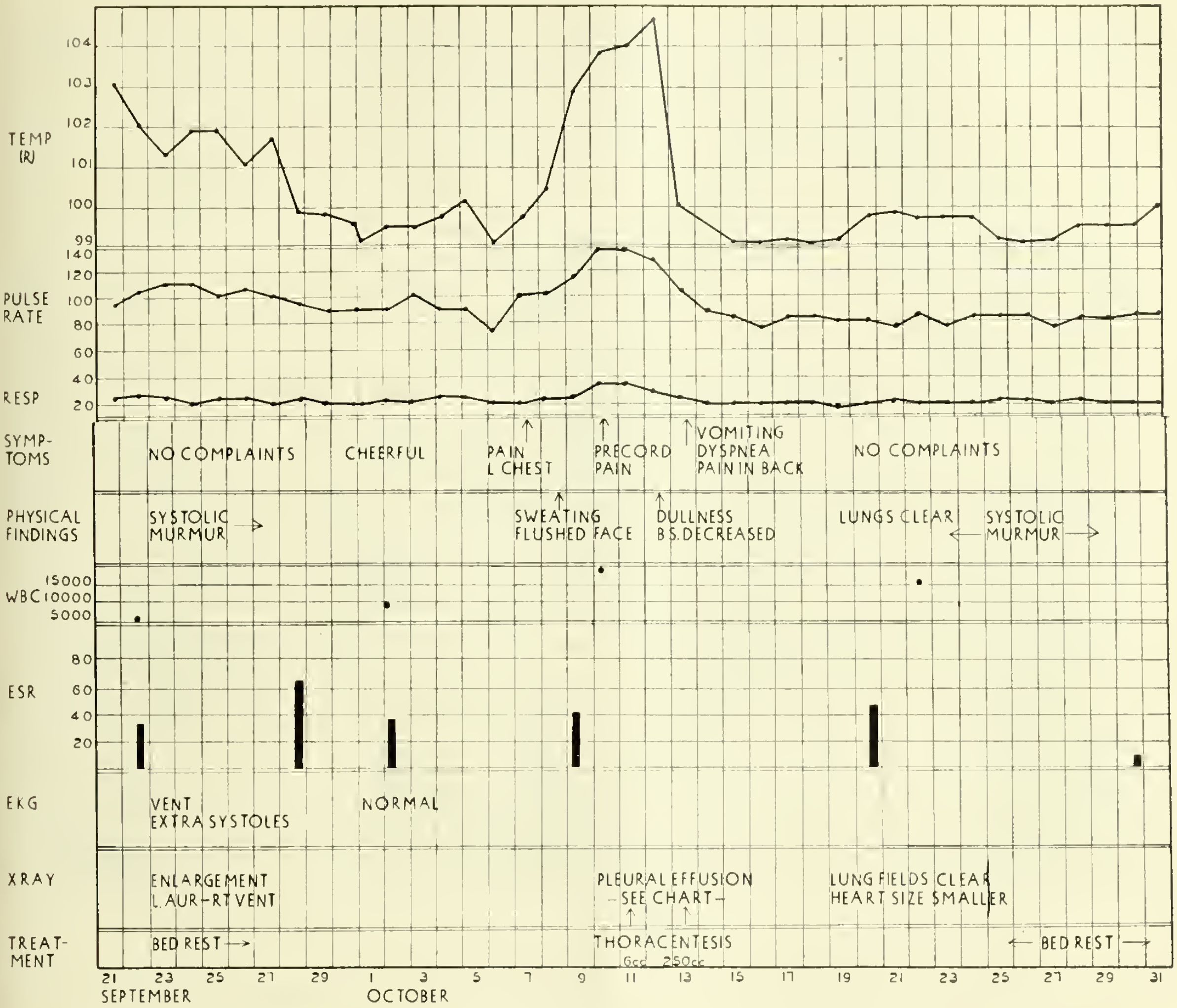

Fig. 1. Schematic representation of the clinical course of a 12-year-old-boy who developed a rheumatic recrudescence, the chief manifestation of which was pleurisy with effusion.

These effusion types in children are most frequently associated with lipid nephrosis or nephrotic nephritis and with rheumatic heart disease. They also may be associated with atelectasis, massive collapse of lung, polyserositis, mediastinal tumors, Hodgkins disease, leukemia, pneumothorax, liver disease, and hypoproteinemia.

Serosanguineous

This type is commonly associated with rheumatic infection, tuberculosis, and with malignancy or pulmonary infarct.

Hemothorax

This is rare in children and is most frequently associated with chest injury, although sometimes occurring with tumors. At present we have under observation a 15 month old female infant with hemothorax, which apparently is part of a thrombo-cytopenic purpura, probably leukemia.

Chylothorax

This is a milky fluid which on rare occasion escapes from the thoracic duct due to a rupture or a congenital anomaly.

In general, we may conclude that when one of these pleural fluids is obtained which is serous, serofibrinous, or serosanguineous and fails to yield organisms on smear or culture, one should look for other evidences of a rheumatic infection.

Few diseases have such a wide variety of manifestations as rheumatic fever. With the growing use of sulfonamides in the prevention of rheumatic recrudescenes and the consequent necessity of ascertaining whether or not activity of the infection exists, the need for intimate acquaintance with the symptomatology of this disease is becoming increasingly important. For convenience, the following review of these manifestations is presented. Some of the specific manifestations are:

Arthritis. Joint pain occurs in about 70 per cent of all rheumatic fever. In children joint pain is apt to be mild and tends to be limited to one or two joints, although, especially in older children, there may be

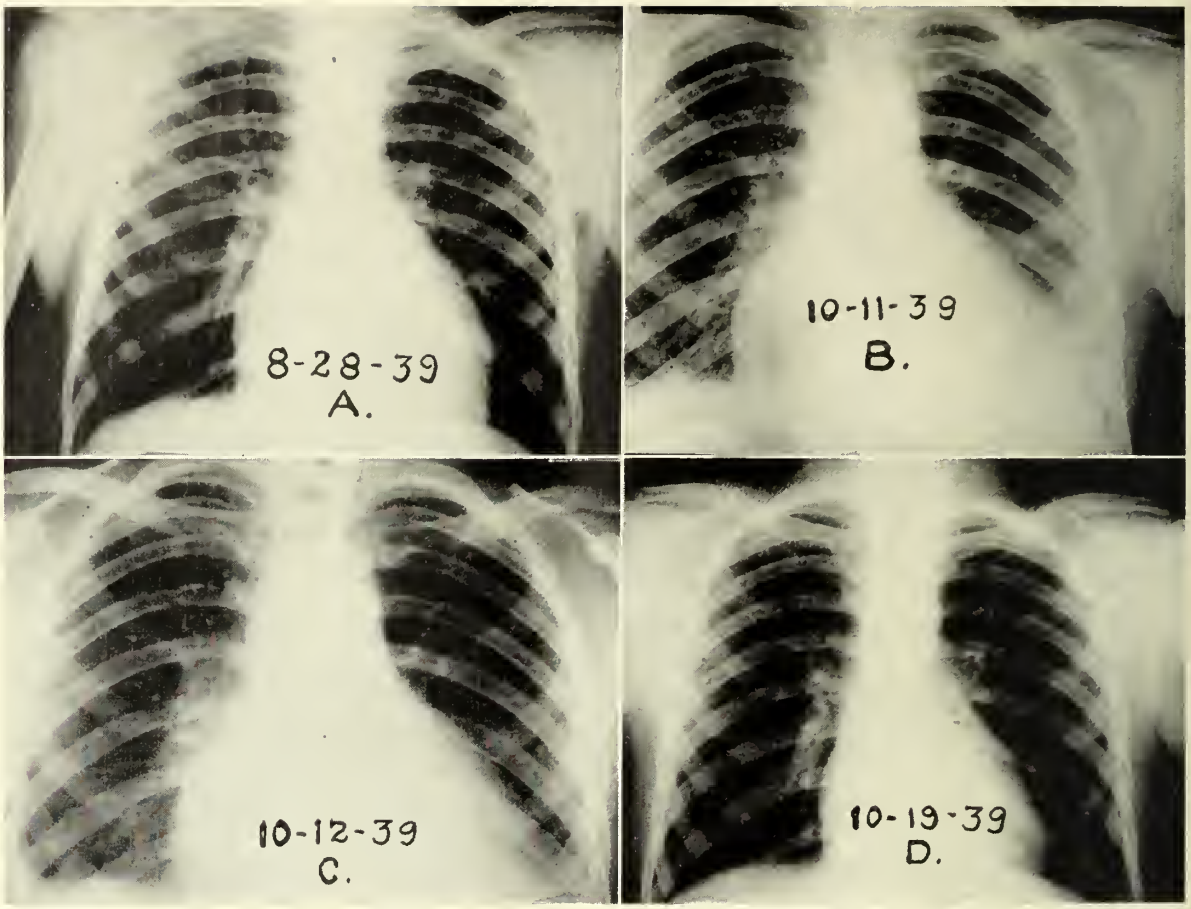

Fig. 2. Serial roentgenograms of the chest, illustrating the development and course of a pleurisy with effusion which was rheumatic in origin: (A) 8-28-'39, lung fields clear; (B) 10-11-'39, pleural exudate, left side; (C) 10-12-'39, following aspiration of 250 cc. of fluid; (D) 10-19-'39, one week later, lung fields clear.

redness, tenderness, and swelling with migration to several joints (polyarthritis) as the knee, ankle, hips, elbows, and small joints. Some attacks are passed off as "growing pains"; on the other hand, the pain may be so severe as to cause confusion with osteomyelitis or occasionally poliomyelitis.

Chorea minor occurs in about 50 per cent of all rheumatic fever patients sometimes during the course of the disease. Outspoken disease is easily recognized; however, mild and early cases are apt to be overlooked. More exact tests** should be used to detect milder degrees of dystonia and muscle weakness, and parents should be questioned concerning emotional disturbances in the child.

Subcutaneous fibroid nodules occur in 14 per cent of all rheumatic fever cases. This perhaps is the most characteristic single sign of acute rheumatic fever and predisposes toward a serious prognosis. However, the presence of nodules is often overlooked, and the frequency with which such nodules are found is probably directly proportional to the intentness of the search that is made for them.

Pericarditis, myocarditis, endocarditis, or *pancarditis* are initial manifestations in 18 per cent of all cases. Lesque says rheumatic fever "licks the joints and bites the heart," and Swift found that 95 per cent of cases show evidence of myocarditis during the acute rheumatic episode. Signs of pericarditis often are not elicited, but evidence of pericardial involvement is found in a high proportion of cases at autopsy. Persistence of murmur is the most reliable guide to a residual injury of the valve, and chronic valvular heart disease usually results from repeated attacks, but seldom from one attack. Prostration, weakness, dyspnea, cyanosis, precordial pain, tachycardia, Tic-Tac rhythm, distant or muffled heart tones, murmurs, and even outspoken decompensation (with edema, cough, liver enlargement, ascites, etc.) are all signs of heart involvement. Roentgenographic and E.K.G. examinations are especially helpful in diagnosing cardiac involvement. In 1000 cases of rheumatic fever studied by Jones[2] 75 per cent were found to have heart disease.

Skin manifestations occur in about 12 per cent of

**Finer Tests: Place the child under an acute strain by having him rest his hands upon the palms of the examiner, and then place his tongue between the lips without touching the teeth. Then ask the subject to sit perfectly still for a few minutes. Even a child 3 to 5 years should be able to sit very quietly for several minutes, whereas the child with mild chorea will have twitching of the face muscles and slight movements (involuntary) of arm, finger, or shoulder muscles.

cases. Erythema annulare rheumatica is a characteristic rheumatic skin manifestation. Erythema nodosum and erythema multiformi and other erythematous as well as purpuric lesions may be rheumatic in origin.

Respiratory and other infections, such as pharyngitis, coryza, sore throat, "flu", scarlet fever, nephritis, myalgia, and inflammation of serous membranes often precede, initiate or are associated with rheumatic fever. Especially important are the signs which are referable to the abdomen (peritoneum and appendix). In one study made at the University Hospital, it was found that in about one-third of rheumatic fever cases referred to the hospital with incorrect diagnosis the outstanding symptom which seemed to cause confusion in diagnosis was the presence of abdominal pain; appendicitis was the diagnosis made by the referring physician in most of these cases. It appears, therefore, that in every case of abdominal pain in a child, the physician should think of the possibility of a rheumatic infection. Pneumonitis and pleuritis may be rheumatic, and the case illustrated in this report shows that pleurisy with effusion may occur with rheumatic fever.[1]

The *general manifestations* for rheumatic fever are not specific but may occur with any type of infection. Some occur so characteristically and frequently with rheumatic fever, however, that their importance must not be overlooked. These include epistaxis, pallor (out of proportion to the hemoglobin), weight loss, fatigue, fretfulness, anorexia, malaise, lassitude, weakness, emotional disturbances, "growing pains," prostration, rapid pulse, leucocytosis, secondary anemia, and malnutrition. These signs and symptoms often antedate the more severe and specific manifestations by weeks or months and are very important in detecting signs of rheumatic activity or recrudescence.

Summary

Pleurisy with effusion characterized a rheumatic recrudescence in a 12 year old boy who experienced a sudden onset of fever with slight dyspnea and pain in the chest several weeks following a typical attack of polyarthritis. Failure to isolate any organisms in the pleural fluid together with the rapid resorption of the exudate seemed to establish this as a clear-cut rheumatic pleurisy with effusion. This manifestation of rheumatic fever is discussed briefly in relation to other types of pleural effusion, and the protean symptomatology of the serious and all-too-prevalent disease of rheumatic fever is reviewed.

References

1. Hansen, Arild E.: Nebraska State M. J. 26:159, 1941.
2. Jones, T. D.: Proc. Amer. Acad. Ped., J. Pediat. 14:395, 1939.

Significance of Adrenal Insufficiency in Childhood*

Report of a Case of Primary Addison's Disease in 11-year-old boy

John A. Anderson, M.D.
Minneapolis, Minnesota

WHILE conditions which involve a deficiency in the function of the adrenal cortex are uncommon in the pediatric age group, their occurrence is frequent enough to warrant a special consideration at this time. Recent advances in the development of clinical diagnostic tests have provided a means of discovering the subclinical states of adrenal insufficiency early in the course of their development. Further, the availability of potent preparations of the adrenal cortex, as well as a more complete understanding of the disturbed physiology in the adrenal deficient state, offer more than ever before a satisfactory outlook in the diagnosis and treatment of both the acute and chronic deficiencies of the adrenal gland.

Adrenal cortical deficiency may occur at any age in children. It may be present in an acute or chronic form as early as the neonatal period and at any time within the first two decades of life. A classification of adrenal deficient states from their etiological aspect is presented as follows:

I. Acute adrenal insufficiency:
  A. Bilateral adrenal hemorrhage
    1. Due to birth trauma
    2. Due to septicemia (most frequently meningococcus)
    3. Due to severe toxemia (burns, etc.)
  B. Acute functional failure in severe toxemia and in malnutrition.
II. Chronic adrenal insufficiency:
  A. Failure of development or atrophy associated with hyperplasia of adrenal "X" zone (chiefly in young infants)
  B. Caseative tuberculosis
  C. Primary atrophy
  D. Functional post-infectious hypoadrenia.

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*From the department of pediatrics, University of Minnesota.

Acute Adrenal Insufficiency

Acute adrenal insufficiency in infants and children is most commonly due to bilateral adrenal hemorrhage. Birth trauma, particularly associated with breech presentations, has been said to produce bilateral adrenal hemorrhage. Vigorous slapping of the back of the infant as a resuscitative measure has also been reported as responsible for adrenal hemorrhage and death. Predisposing factors toward acute adrenal hemorrhage in the neonatal period are thought to be hypoprothrombinemia and the great vascularity and friability of the adrenal glands. Severe toxemia due to extensive burns may be responsible for hemorrhages into the adrenal. The most common cause of acute hemorrhage is, however, a severe overwhelming septicemia, usually due to the meningococcus. This is commonly known as the Waterhouse-Friderichsen syndrome. This symptom complex associated with bilateral adrenal hemorrhage was first described by Marchand[1] in 1880 in a case of Werlhof's purpura. Voelcker[2] in 1894 again described it. Little[3] in 1901 recognized the disease as a specific clinical entity. Waterhouse[4] in 1911 reported one case and collected fifteen from the literature. Friderichsen[5] in 1918 brought the literature up to date and emphasized the specific clinicopathologic picture, but added no new information concerning the etiology.

The incidence of adrenal hemorrhage in 3,637 consecutive autopsies in persons of all ages was found by Snelling and Erb[6] to be 1.19 per cent. Of the 43 cases showing adrenal hemorrhage, 15 were newborn infants. Sachs[7] in 1937 found 64 reported cases of hemorrhage of the adrenals to which he added two of his own. Since 1937 single cases have been reported by de Bruin,[8] Rutishauser and Barbey,[9] Sulzer,[10] Amber,[11] Pontieri,[12] Kunstadter,[13] Bichel,[14] Levinson,[15] Carey,[16] Moss and Schenken,[17] Hughes,[18] Grace, Harrison and Davie,[19] Nunes,[20] Lindsay, Rice and Selinger,[21] Danciger,[22] Monfort and Mehrling.[23] Cases have also been reported by Ahumada and Tejada (4 cases[24]), von Szasz (4 cases[25]), and Drummond and Tooke (2 cases[26]). This makes a total of 92 cases.

In the reported cases the ages varied from 12 days to 9 years; only 10 per cent were present in adults. Approximately 70 per cent occurred in infants 2 years or younger.

The history is essentially that of a healthy child who suddenly becomes ill. The early symptoms are such as may occur in any acute infection. The child may awaken at night with a cry and begin to vomit. High fever is usually noted, septic in type, and at times reaching 108° F. rectally. Sudden fluctuations are more significant than sustained high fever. Diarrhea and abdominal pain without localization are frequent. Delirium, restlessness, and generalized convulsions are not uncommon. A lethargic, stuporous state soon occurs, associated with severe cyanosis or alternating cyanosis and pallor. The respirations are shallow, rapid, and out of proportion to the indications of pulmonary involvement. Soon after the onset a petechial eruption occurs, involving the face, neck, and extremities. The petechiae appear quite suddenly and soon become associated with a diffuse, macular purpuric rash. The skin may have a mottled, livid appearance not unlike postmortem lividity.

When examined, the child appears extremely toxic, often comatose, and breathes very rapidly and shallowly. Early in the course the pulse is full and rapid; later, it is feeble, thready, and "shock like." The skin reveals the rash. Neck rigidity or suggestion of meningismus is present infrequently. The events run their course in twenty-four to forty-eight hours, terminating in death. Many variants from the course described have been noted.

Laboratory examination is of little help. Leucocytosis and thrombocytopenia are described. Electrolyte determinations of the blood have not been made with the exception of calcium and phosphorus, which are reported to be normal. Spinal fluid abnormalities have been found occasionally. Aegenter describes six cases in which meningococci were found in the spinal fluid, three of which had a slight increase in polymorphonuclear cells. Culture or smear of the blood for organisms has revealed the meningococcus about 70 per cent of the time. The staphylococcus, streptococcus, and pneumococcus have also been found.

Pathology. Bilateral adrenal hemorrhage has been found in 95 per cent of the cases studied. Occasionally only one adrenal is involved. The hemorrhage into the adrenal may be pin point petechial or massive in type with resultant hemorrhagic necrosis. The greatest hemorrhage appears to be in the region of the medulla and zona reticularis of the cortex. Thrombosis or embolism is rarely seen. The skin lesions are due to direct capillary and arteriolar involvement by the causative organism. The brain shows only congestion of the superficial vessels of the lepto-meninges.

Other findings are those suggesting an acute infection. Cloudy swelling of the organs, splenic enlargement, pulmonary edema, and congestion are common.

Of particular importance is the frequent occurrence of enlargement of the thymus, mesenteric lymph nodes, hyperplasia of Peyers patches and of the solitary lymph follicles of the intestines. In a review by Sachs it was noted that 10 of 64 reported cases had an enlarged thymus. This was also pointed out by Rabinowitz[27] and Bamatter.[28]

Etiology. A review of the literature of the Waterhouse-Friderichsen syndrome suggests the conclusion that the adrenal hemorrhage is evidence of an ectodermal tropism due to the meningococcus most commonly and the pneumococcus and streptococcus occasionally. The increasing number of reports of acute adrenal hemorrhage in which the causative organism has been found has lent added weight to the concept that this entity is due to a septicemia. Consequently, cases of acute adrenal hemorrhage in the newborn period should be examined thoroughly with this in mind, as it is possible that the condition may also be due to infection, either of intra- or extra-uterine origin.

Treatment. The rapid course and evidence of overwhelming symptoms in this condition demand immediate therapeutic measures. Since the meningococcus appears to be the chief offending causative agent, the use of large doses of sulfanilamide, sulfapyridine, sulfathiazole, or sulfadiazine is imperative. In order to achieve an effective blood concentration rapidly, subcutaneous or intravenous administration of the soluble salt of these agents should be given at once. The use of supportive measures such as intravenous glucose, saline, and blood transfusions as well as oxygen is imperative. While it is doubtful that the early symptoms are due to insufficiency of the adrenal cortical hormone, it is possible that those occurring after twenty-four hours may be related to such insufficiency. Large doses of the crude extract of adrenal cortical gland as well as desoxycorticosterone acetate would appear to be indicated.

Chronic Adrenal Insufficiency

Recently three cases of adrenal insufficiency have been described in which macrogenitosomia precox was also present. Butler, Ross and Talbot[29] report a case in which brownish pigmentation of the skin, enlarged penis, excessive excretion of urinary estrogens and androgens, and sudden collapse on restriction of fluids or of added salt in the diet were noted. There was also an elevated serum potassium and a decreased serum sodium. during crisis. Wilkins, Fleischman, and Howard[30] have also reported a case with macrogenitosomia and adrenal insufficiency in a child. This patient had sudden fatal collapse on withdrawal of extra salt from the diet. Abnormally high excretion of urinary androgens and estrogens was noted. Postmortem examination revealed a persistence and marked hyperplasia of the fetal cortical zone of the adrenal glands. This was so extensive that it appeared to have completely replaced the normal type of cell. A testicular tumor consisting of cells morphologically similar to the cells of the fetal adrenal cortical zone was also found.

Thelander and Cholffin[31] have also described a case of adrenal insufficiency, associated with signs of excessive activity of hyperplasia of the adrenal "X" zone.

Cases of adrenal hypertrophy in infants who had had vomiting, diarrhea, and dehydration during life have been described by several authors. It is possible that these cases also had an adrenal insufficiency as regards the factor controlling salt and water metabolism.

A case presenting similar signs of pigmentation, anorexia, dehydration, lethargy, and elevated NPN at birth was investigated by Dr. W. H. Thompson of the department of pediatrics, University of Minnesota. An increased excertion of urinary androgens was also found in this case. While this form of adrenal insufficiency is rare, the association of hyperfunction of one adrenal zone and hypofunction of another is of great interest. Butler suggests that in these cases there may be a hyperplasia of the fetal type of cortex and an underdevelopment of the adult type of cortex. This was clearly demonstrated at autopsy in the case reported by Wilkins.[30]

While macrogenitosomia precox is usually due to tumors of the adrenal gland, it is possible that some may be due to simple hyperplasia. The presence of advanced ossification, rapid body growth, and enlarged penis and testes suggests hyperplasia of adrenal "X" zone. An investigation of the serum electrolytes in such cases may reveal the presence of an associated hypoadrenia.

Apart from destructive lesions of the adrenal gland such as are due to caseative tuberculosis, adrenal insufficiency in children is due occasionally to primary atrophy.

Tuberculous caseative lesions of the adrenal are the most common cause of adrenal insufficiency in children as well as in adults. The incidence of atrophy of adrenal, however, has been recently shown to be far more frequent than previously reported. Susman[32] notes that for all ages, from 13 to 50 per cent of cases of Addison's disease reported in the literature may be due to atrophy, usually of undetermined etiology.

Addison's disease in children due to tuberculosis, atrophy, or tumor pressure is rare. Holt and McIntosh[33] mention 37 cases under 15 years of age. Snelling and Erb[34] have reviewed the literature of Addison's disease in children and present a case in a 9½ year old boy, probably the youngest on record, due to primary atrophy. Kagan and Holcberg,[35] Ginandes,[36] and Renshaw and Manning[37] have also reported cases of Addison's disease in children.

The symptoms of Addison's disease in children are essentially the same as in the older patient, the outstanding of which are pigmentation of the skin and mucous membranes, asthenia, hypotension, anorexia, nausea, vomiting, and weight loss. The signs and symptoms may appear insidiously or they may follow an acute respiratory infection rather suddenly. A marked craving for salt has been noted in children. The electrolyte changes in the blood consisting of an elevated serum potassium, low serum chloride, and sodium are present. Hemoconcentration, nitrogen retention, and hypoglycemia are present during crisis.

Early diagnosis is difficult. Several clinical tests may be of value. Robinson, Power, and Kepler[38] have devised a "water test" based on the fact that in most cases of Addison's disease, the kidneys continue to excrete fairly concentrated urine even after water has been ingested. The test is conducted as follows: After omitting salt from the regular diet for one day, the patient is requested to eat and drink nothing after 6 P. M. that day. All urine is collected from 10:30 P. M. to 7:30 A. M. At this time a blood specimen is drawn and kept for determination of the urea and chloride concentration if such should be indicated. At 8:30 A. M., 20 cc. of water per kilogram of body weight is then given within the next 45 minutes. The patient then voids at 9:30, 10:30, 11:30 A. M. and 12:30 P. M., resting in bed throughout the test. The volume of the largest of these specimens is measured. If the volume of any single hourly specimen voided during the morning is greater than the total volume voided during the night, the response is negative. If the volume of the largest hourly specimen voided during the morning is less than the volume of the urine during the night, the test is positive. Further confirmation may be obtained by calculating the factor derived from:

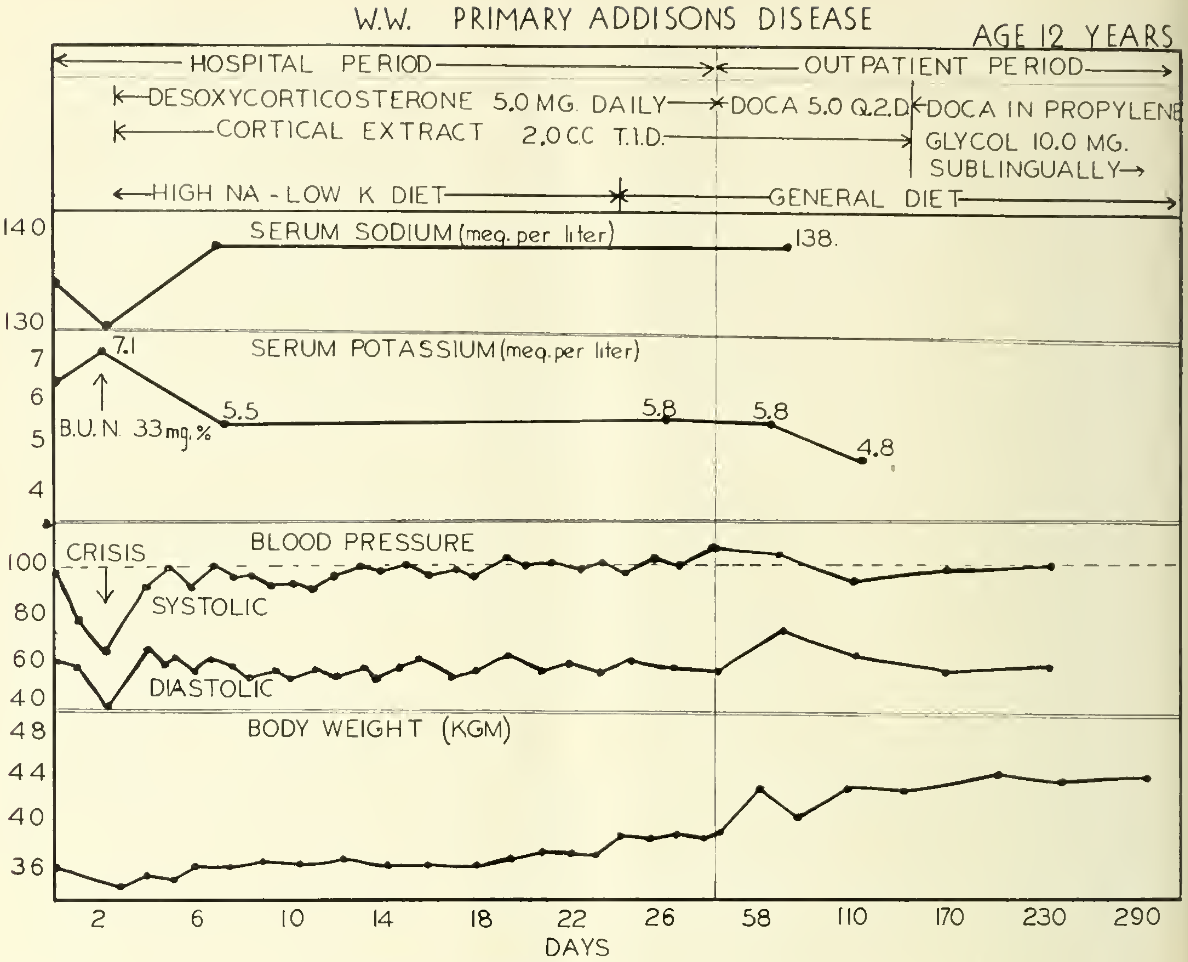

Fig. 1. The course of a case of primary Addison's disease in a 12-year-old boy (Doca = desoxycorticosterone acetate).

$$\frac{\text{Urine urea concentration (of night specimen)}}{\text{Plasma urea concentration}} \times \frac{\text{Plasma Cl concentration}}{\text{Urine Cl concentration (of the night specimen)}} \times \frac{\text{Volume of day urine (greatest hour specimen)}}{\text{Volume of night urine (total for 10:30 P. M. to 7:30 A. M.)}}$$

If this value is greater than 30, Addison's disease is probably not present. If less than 25, the patient has Addison's disease, provided that nephritis has been excluded. Further, a careful study, according to Cutler, Power, and Wilder[39] of the sodium and chloride concentration in the urine, following a three-day period of low salt and high potassium intake, appears to be the best objective test at present, although this procedure may induce a severe crisis. There is a marked inability to retain salt under these circumstances.

Case Report

The following is a case history of an 11 year old boy who manifested all of the clinical signs and symptoms of Addison's disease:

W. W., aged 12, was admitted to the University of Minnesota Hospital on 29 March, 1941. The child was apparently well until the age of 10 years, when he became listless. At that time excessive tanning of the skin was noted during the summer and this failed to disappear as winter approached. Even unexposed parts of the body became pigmented uniformly. Salt craving was also noted. In fact, the patient would salt all articles of food heavily. The parents concealed the salt from him, believing so much salt harmful, and the child then resorted to the cattle "salt lick" near the barn. Because of a right inguinal hernia and a cryptorchidism, an operation had been conducted in the fall of 1939. Slow convalescence had been observed. In August, 1940, the patient had had a cold associated with symptoms of severe nausea, vomiting, and convulsions, which had required hospitalization. Three months later in November, the child again had a severe cold associated with nausea, vomiting, anorexia and loss of weight. From that time until admission to the hospital on 12 March, 1941, anorexia, listlessness, occasional nausea and vomiting, weakness, nocturia, and skin pigmentation had been noted. His past history was negative except for measles (age 7), German measles (age 7), chicken pox (age 8), tonsilectomy (age 10), all without complications.

Physical Examination. The patient was a well developed, poorly nourished white male. Marked weakness and listlessness were noted. Blood pressure was 96/60 mm. of mercury; pulse was 85 beats per minute. Deep, generalized pigmentation was noted. There were small pin point areas of pigmentation on the mucous membranes of both cheeks. System examinations were essentially normal, except for heart and genitalia. The heart appeared to be small and of the drop type. There was a right hernioplasty scar with absence of the testicle on that side. Laboratory examination was made. A routine urine examination proved negative. The white blood count was 10,000 with a normal differential. Hemoglobin was 12.88 Gm. per cent

(Sahli). Hematocrit was 52 per cent. Following a 15-hour fast a blood specimen was taken for determination of the serum electrolytes. At this time the blood pressure fell to 62/38, and nausea and extreme listlessness were noted. The electrolytes were found to be as follows: serum chloride 100.8 m. eq. per liter (355 mg./per cent), serum sodium 130.6 m. eq. per liter (299 mg./per cent), potassium 7.1 m. eq. per liter (28 mg./per cent). Blood urea nitrogen was 33 mg./per cent (normal value 15 to 20). The fasting blood sugar was found to be 89 mg./per cent. Carbon dioxide combining power was 49 vol./per cent. The Schick test, the tuberculin test and the Wassermann reaction were negative. Intravenous pyelogram of the kidney pelvis was normal. X-rays of the abdomen and chest were negative. Electrocardiogram was found to be negative.

Course and Treatment (see Figure 1). Following the impending Addisonian crisis at the time of the original laboratory determinations, intravenous sodium chloride and glucose were given in large quantities. Desoxycorticosterone and adrenal cortical extract (Upjohn) were also given in large doses. A low potassium, high sodium diet was then instituted. Five mg. of desoxycorticosterone acetate in sesame oil, and 6 cc. of adrenal cortical extract were also given intramuscularly daily. Within three days the electrolytes of the serum and the hematocrit were essentially normal. The blood pressure increased to 100/60 mm. of mercury. Following discharge from the hospital, the child was allowed to take a general diet, but the desoxycorticosterone acetate and adrenal cortical extract were continued. Weight gain continued satisfactorily. The child was well and vigorous and assisted in the labors about the farm without fatigue or complaint. He was then placed on 5.0 mg. of desoxycorticosterone acetate in propylene glycol sublingually twice a day and has been doing well on this dosage up to the present time, approximately one year since admission to the hospital.

DISCUSSION

This patient may be considered as having a primary atrophy of the adrenals, since no clinical evidence of tuberculosis or tumor encroachment upon the adrenals could be found. The response to therapy has been entirely satisfactory. Growth in weight and height has progressed normally. While no ultimate prognosis can be offered, it has been stated by Holt and McIntosh that adequate treatment over a period of several years has appeared to be associated with some regeneration of adrenal cortical tissue as judged by the continued clinical improvement and the decreased hormone requirement. Apart from the more specific and rather characteristic entities due to either acute or chronic adrenal cortical insufficiency, many conditions may show symptoms during their course that suggest an insufficient function of the adrenal gland. In severe acute infections when the occurrence of extreme toxicity is out of proportion to the expected course of the disease, supportive therapy with adrenal cortical extract may be indicated.

The adrenal gland is susceptible to degenerative or inflammatory changes in the course of almost any acute systemic infection. The normal adrenal tissues, however, possess considerable power of regeneration; hence their recovery is usually complete without permanent damage or functional deficiency. While asthenia and allied symptoms have been described frequently in adults following influenza and other infections which may possibly be related to a temporary functional insufficiency, this difficulty has not been reported in children. The restorative response following infection is usually rapid and complete. The regenerative powers of the adrenal tissue may possibly be more rapid and complete. Recent experimental work on the changes in the adrenal associated with avitaminosis of the B complex type lend support to the already obvious indications that the child be assured of a diet complete in all respects during the active infectious as well as the period of convalescence. Determinations of the blood electrolytes and the use of the clinical tests mentioned may establish the existence of hypoadrenia in children. Particular attention should be paid to children manifesting evidence of hypophyseal deficiency, as here adrenal deficiency would possibly be more likely to occur.

BIBLIOGRAPHY

1. Marchand: cited by Monfort and Mehrling (see note 22).

2. Voelcker, A. F.: Pathological Report, Middlesex Hosp. Rep. 1894-1895.

3. Little, E. G.: Brit. Jr. Dermat. 13:445, 1901.

4. Waterhouse, R.: Lancet 1:576, 1911.

5. Friderichsen, C.: Jahrb. f. Kinderheilk. 87:109, 1918.

6. Snelling, C. E., and Erb, I. H.: J. Pediat. 6:22, 1935.

7. Sacks, M.: Ann. Int. Med. 10:2, 1105, 1937.

8. de Bruin, M.: Monadschr. I. kindergeneesk. 6:343, 1937.

9. Rutishauser, E., and Barbey, H.: Ann. d'anat. Path. 13:143, 1936.

10. Sulzer, H.: Kinderartzl. Praxis 8:508, 1937.

11. Amber, A. K.: Monatschr. f. Kinderk. 71:351, 1937.

12. Pontieri, F.: Med. Ital. 20:231, 1939.

13. Kunstadter, R. H.: Sox. trans. Chicago Ped. Soc. Am. J. Dis. Child. 57:1213, 1939.

14. Bichel, G.: Rev. med. de la Suisse Rom. 60:1058, 1940.

15. Levinson, S. A.: J. Pediat. 14:506, 1939.

16. Carey, T. N.: Ann. Int. Med. 13:1740, 1940.

17. Moss, E. S., and Schenken, J. R.: New Orleans M. & S. J. 93:294, 1940.

18. Hughes, J. F.: Brit. M. J. 2:353, 1940.

19. Grace, W. H., Harrison, C. V., and Davie, T. B.: Lancet 2:102, 1940.

20. Nunes, S., Lisboa med. 17:459, 1940.

21. Lindsay, J. W., Rice, E. C., Selinger, M. A., and Roberts, L.: Am. J. M. Sc. 201:263, 1941.

22. Danciger, J. A.: J. Pediat. 16:495, 1940.

23. Monfort, J. A., and Mehrling, J. H.: Am. J. Dis. Child. 62:144, 1941.

24. Ahumada, O., and Tejada, M.: Rev. chilena de pediat. 9:756, 1938.

25. von Szasz, A.: Monatschr. f. Kinderh. 79:332, 1939.

26. Drummond, W. F., and Tooke, T. B.: New Orleans M. & S. J. 94:11, 1941.

27. Rabinowitz, M. A.: Am. Jr. Med. Sci. 27:513, 1923.

28. Bamatter, F.: Jahrb. f. Kinderh. 139:149, 1933.

29. Butler, A. M., Ross, R. A., and Talbot, N. B.: J. Pediat. 15:831, 1939.

30. Wilkins, L., Fleischman, W., and Howard, J. E.: Endocrinology 26:385, 1940.

31. Thelander, H. E., and Cholffin, M.: J. Pediat. 18:779, 1941.

32. Susman, W.: Endocrinology 20:383, 1940.

33. Holt, L. E., and McIntosh, R.: Diseases of Infancy and Childhood; 11th edition; New York-London, D. Appleton-Century Co., 1939.

34. Snelling, C. E., and Erb, I. H.: J. Pediat. 7:669, 1935.

35. Kagan, L., and Holcberg, B.: Jahrb. f. Kinderh. 149:101, 1936.

36. Ginandes, G. J.: Am. J. Dis. Child. 59:333, 1940.

37. Renshaw, A., and Manning, G. B.: Lancet 1:393, 1939.

38. Robinson, F. J., Power, M. H., and Kepler, E. J.: Proc. Staff meeting of Mayo Clinic 16:577, 1941.

39. Cutler, H. H., Power, M. H., and Wilder, R. M.: Proc. Staff Meet. Mayo Clinic 13:244, 1938.

Why School Children Fail*

Max Seham, M.D.
Minneapolis, Minnesota

It may seem presumptuous for a physician to discuss "Why School Children Fail," but a close examination of the question reveals the fact that the causes of retardation and failure of school children are medical as well as educational. A retarded child is a sick child in the sense that it is an inadequate child, and conversely, a sick child becomes sooner or later a retarded child. Therefore, it is not only right but also necessary for the physician to understand all the causes of school failure. The physician is frequently challenged by this problem not only because the histories of his patients of school age reveal that failure is an associated secondary finding but also because these children are brought to him chiefly or primarily for this complaint.

The average American child enters public school at the age of six. If during his school career he falls below his grade for his chronological age, he is considered retarded. By this criterion one-third of our American children are retarded or are failing in the elementary schools. This means that one out of three children does not finish the eighth grade at fourteen years of age, if at all.

The immediate causes of failure and retardation are numerous. Some are found within the child because of his poor natural endowment; others may arise from the environment in which he lives, while still others may be the result of faulty or unskillful practice of teaching.

In addition to the usual physical medical appraisal, the physician must note intelligence, special abilities and disabilities, attitudes towards school and teachers, personal relationships to other pupils, social adjustments in the school, suspicious behavior trends, and attendance at school. The physician cannot afford to neglect anything about the child and his school environment that may complete his knowledge of the "whole child."

A routine intelligence test should be made, supplemented by a personality study wherever possible. If there is no psychologist in the community the physician can learn to give a Binet-Simon test himself. For practical purposes children with an I. Q. of 70 or under may be considered feeble-minded. The majority of feeble-minded children are born with inferior mentality. A small number became so because of such organic diseases as hydrocephalus, birth-palsy, meningitis, encephalitis, syphilis, epilepsy, and thyroid disease. Children whose mental ratio lies between 85 and 100 are regarded as "low normals" and those with a ratio of 71 to 85 are considered "dull". Sixty per cent of the cases of educational backwardness fall in the class of "dull".

There are definite physical criteria known as stigmata of degeneration by which a child can be suspected of mental retardation:

1. Defective height and weight. Development is either arrested as a whole (as is most common) or restricted to one or several of the bodily aspects.
2. An undersized or misshapen head.
3. Misshaped ears with peculiarities in form and size.
4. Deformities relative to the eyes: crossed eyes, nystagmus, small oblique openings between the eyelids.
5. Peculiarities in size and form of the nose, lips, and palate.
6. A protruding jaw or a small, receding jaw.
7. Adenoidal faces.
8. Irregularities in position, number, form and size, as well as delay in eruption, of temporary as well as permanent teeth.
9. Absence of hair from the customary places or its appearance in unusual places.
10. Congenital defectiveness of any function or organ, for instance, the heart.

By themselves, stigmata of degeneration should never be taken as evidence of feeble-mindedness. They should be used only as criteria for suspicion; and the suspicion must always be confirmed or refuted by mental tests and further observations. However, in a child known to be retarded in school, the presence of these stigmata may be accepted as evidence that this retardation is not soon to be outgrown but is due to factors not easily remedied, and as the result of inherent permanent inadequacy.

In the mentally defective child, motor coördination and muscular judgment are poor. The child ties his shoes with difficulty; he blunders buttoning his coat. His speech is impaired. He lacks acuteness of perception, knows no self-criticism, possesses no foresight, prudence, and inventiveness. He rates low in retention and recall. He offers no spontaneous attention. What little attention he gives is easily distracted by trifling environmental stimuli. He cannot associate words with the objects they designate, nor can he recognize printed characters or numerals as symbols of concrete objects. Though able to match colors he cannot name them. Equipped with low sensory capacity, he does not discriminate between different intensities of sensory impressions of the same order (visual or auditory).

A second important group of causes of school failure and retardation is related to the physiologic fitness of the body. Even in the presence of normal mental capacity, mental output as measured by scholarship becomes inferior because of lessened energy and increased fatigue. These conditions do not change mental levels but they do change mental output. The effect of such physiological disturbances as chronic fatigue, "nervousness", and malnutrition is far reaching. From the standpoint of the general practitioner it is impractical to try to draw a sharp line of demarcation between these three common disorders. All three must be accepted as stages of a dynamic imbalance of the body springing from the same general sources. Their causal factors are practically the same: (1) Diet, inadequate in quantity and quality. Evidence is rapidly accumulating that even such mild transgressions in diet as the omission of a single food element may produce a state of lowered vitality and give rise to behavior disturbances and consequently, to school achievement. Indigestible foods, foods lacking essential vitamins, bad racial customs of cooking, and disturbing psychological situations at meal time have their bearing on biological fitness and school fitness. (2) Sleep, insufficient or disturbed. (3) Physical activity, prolonged and excessive. (4) Overstrain, accumulated and residual.

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*From the department of pediatrics, University of Minnesota.

In addition to a low I. Q., or functional disturbances as causes of school failure, a third factor may be organic physical inadequacy. Physical defects and physical disease should be diagnosed and treated. Even though the physical disease may not have a direct effect upon the school work, the child should be given the benefit of the doubt.

And finally, very important (though often neglected) are the socioeconomic factors, such as child labor, inadequate housing, lack of sunshine, lack of fresh air, exposure to inclemencies of weather, lack of medical care, and poverty. Poverty affects the child by depriving him of proper food, proper sleep, proper clothing, and proper housing. Studies have shown that educational backwardness is most prevalent in the poor, overcrowded, insanitary homes where the families are large, where the parents are largely dependent on charity and relief, where the child's health is undermined from the earliest days of his life. There is little opportunity for optimum growth and development where poverty enslaves the body and mind. In a home stricken with poverty the child frequently is absent either because he is needed in the home, or because he lacks warm clothing or small funds for school supplies.

Medicine concerned itself in the past entirely with the study and treatment of organic and physical diseases. Today, however, medicine has come to rest on the broader bases of biology. The more the private practitioner takes to himself the allied branches of sociology, educational and medical psychology, the more successful will he be in the diagnosis and treatment of the retarded child.

CIVILIAN HEALTH IN NATIONAL DEFENSE

It may be estimated that 70 million sick persons each year lose over one billion days from work or customary activities and that the cost of illness and premature death in this country amounts annually to about ten billion dollars. The decline in the total death rate has been accomplished largely by life-saving in infancy and childhood, thus allowing larger numbers to reach the age of maturity. Consequently, there is an upward trend in diseases of middle and old age, such as heart disease, nephritis, cancer and diabetes.

More than half of all tuberculosis deaths occur in the age group 15 to 45. This heavy loss comes approximately within the age limits for military service. And for every death there are approximately ten clinical cases of illness from tuberculosis.

Disabling conditions among children, dental defects, venereal diseases, pneumonia, malaria and accidents are other leading causes of death and disability. The mental hospitals contain about half a million inmates with 50,000 on parole and about 75,000 patients are in institutions for the feeble-minded and epileptic.

Studies of the economic status of families shows a direct correlation of sickness with low income. Disability due to illness was nearly two and one-half times as great among persons in the income group under $1,200 (annually) as in the group above $3,000. When it is recalled that the low income groups constitute a large proportion of those who are employed in industries more or less directly connected with national defense, the losses sustained as a result of unnecessary illness may be regarded in the light of domestic sabotage.

Influenzal Meningitis*

A. Hill, M.D.
E. S. Platou, M.D.
Minneapolis, Minnesota

SINCE *H. Influenzæ* ranks as one of the most common causes of meningitis in children and since the fatality rate in this disease has always been high the following case is reported to illustrate the effectiveness of the new Alexander antibody nitrogen of type B influenza.

It is, of course, well known that infants under two years are lacking in antibodies as is shown in Fothergill's chart of age incidence in this disease (fig. 1).

Case Report

An eight months old female infant was admitted to the Minneapolis General Hospital in the first week of October, 1941. The infant had been suffering from an upper respiratory infection for two days prior to admission, and was admitted because of the history of a generalized convulsion about an hour previously. Birth and developmental histories were negative.

Examinations revealed a mild pharyngitis and minimal stiffness of the neck. All other findings were within normal limits. Spinal puncture at this time showed 6,000 cells with 97 per cent polymorphonuclear cells, 45 mgm./per cent sugar, and 60 mgm./per cent protein. White blood count was 11,000 cells with 67 per cent polys. Her temperature was 103 rectally, hemoglobin 40 per cent (Sahli).

Sulfapyridine was begun intravenously, 2 grams in 200 cc. Hartmann's solution in three hours, then 2 grams in the subsequent eight hours. By this time the organism was found to be *Hemophilus influenzæ*. The drug was changed to sulfadiazine of which 4 grams were given in the succeeding twenty-four hours, and 75 mgm. antibody nitrogen of type B influenza serum (rabbit) was given intravenously. The blood level of the drug was 12 mgm./per cent, the spinal fluid level 5.7 mgm. The daily dosage of sulfadiazine by mouth was increased from 1.5 Gm. to 3 Gm. daily and two days after the first dosage a second of 25 mgm. of antibody nitrogen was given intravenously. Blood cultures for *H. influenzæ* remained negative.

By the fifth day the spinal fluid findings, except for the cells (600), the white blood cell count and the well-being of the child had approached normal. The temperature remained elevated until the ninth day (103—105). The hemoglobin remained around 60 per cent in spite of repeated transfusions until the ninth day. On the tenth day the spinal fluid revealed, for the first time, no organisms, and from this time on the child remained essentially normal. The drug was discontinued ten days after the organisms had disappeared from the spinal fluid, and the infant was discharged well after a hospitalization of thirty-three days.

Accurate bacteriologic investigation early in the course of Influenzal Meningitis is of course paramount, since type B Influenza bacillus is responsible for all the serious Influenzal infections in infants and children. The type specificity of this organism depends on its soluble specific carbohydrate in the capsule. This antigen is employed in making potent rabbit antiserum (antibody nitrogen).

Since sulfa drugs have been shown to have a bacteriostatic effect on the Influenza organism, the combined use of antibody and drug appears to be the treatment of choice.

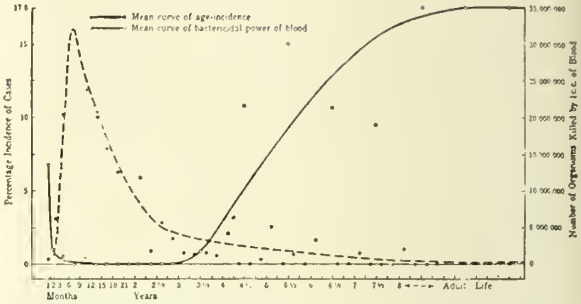

Fig. 1. The Relation of Age Incidence of H. Influenzae Meningitis to the Bactericidal Power of Human Blood at Different Ages against a Smooth Meningeal Strain of H. Influenzae. Taken from Fothergill and Wright (16).

With such therapy Dr. Alexander[1] can now report a reduction in case fatality to 35 per cent in fifty cases. Certain principles which she has established as a therapeutic guide are appended here:

Most errors are in inaccurate bacteriology.

1. Antibody effectiveness is diminished if free capsule carbohydrate is not "washed out" of the body before administration of type-specific anticarbohydrate serum.
2. The urinary excretion of free carbohydrate present in the body is speeded up by administration of intravenous fluids containing sulfonamide compounds, which inhibit formation of further free carbohydrate. This is done by continuous intravenous drip of 0.1 gm. per kilo over 4 hour period in 40 cc. of Ringer's or saline per kilo.
3. Following a three hour period of forced fluids the serum is given preferably except in chronic cases, intravenously, 75—100 mgm. antibody nitrogen, diluted in 200—300 Ringer's or saline containing sulfonamides, given over a 2 hour period. In chronic cases or where the meningeal response is poor, an additional 25 mgm. antibody nitrogen is given intrathecally.
4. Adequacy of the dose is checked one hour later by testing the patient's serum for its ability to produce capsular swelling in the organism. (The original spinal fluid serves well to determine capsular swelling if the organisms are numerous and if 0.4 per cent formalin is added within an hour after removal, the fluid is kept on ice, and removed only 5 minutes each day for specimens). If it is necessary to use culture, use young culture (4—6 hours old) on Levinthal broth. Check condition of capsules by specific antisera.
5. Lumbar punctures are performed daily for drainage and to check chemical and cellular reactions of the spinal fluid.
6. Intrathecal use of 5 cc. human complement may help.
7. If, 24 hours later, the spinal fluid shows no organisms, chlorides and sugar are rising, protein and cells

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*From the department of pediatrics, University of Minnesota.

[1] Personal communication.

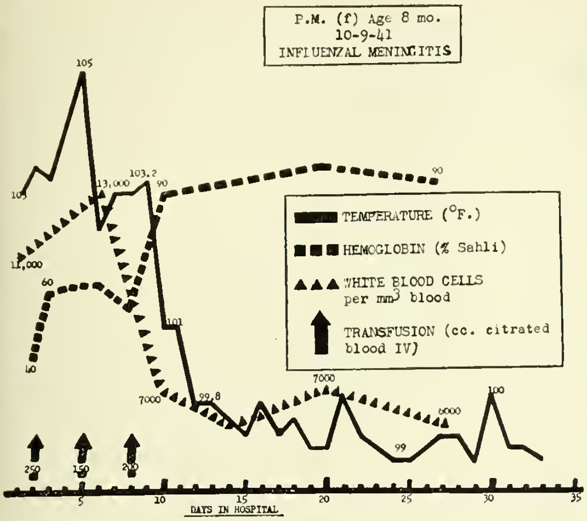

Fig. 2.

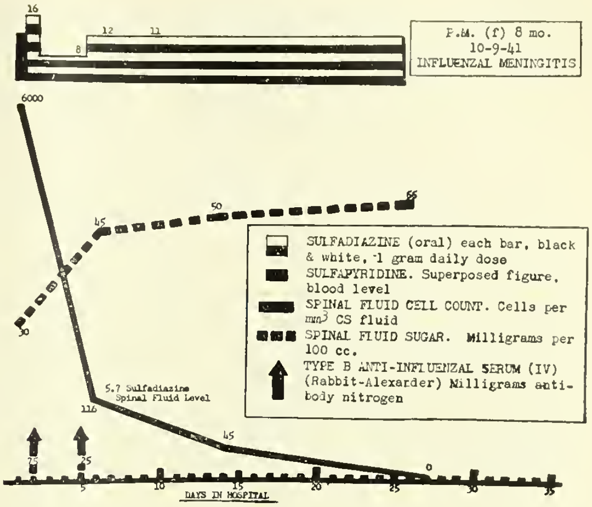

Fig. 3.

are falling, and if the free antibody persists in the patient's serum in such amounts that a 1:10 dilution produces capsular swelling, no further serum is indicated.

8. Sulfonamide is given intravenously by drip for 24 hours, maintaining a concentration of 10 mgm./per cent (sulfanilamide). If oral administration is tolerated, the drug may be given in this manner during the ensuing period. (Total dose 0.1 gm./kilo as maintenance). The initial 24 hour dose is 0.3 gm./kilo. The drug is continued for one week after the first sterile spinal fluid culture. (Sulfapyridine more frequently causes granulocytopenia).

9. The most delicate practical index of the patient's improvement is found in increase in the spinal fluid sugar and chlorides, decrease in protein.

10. Most patients show a temperature response to the serum which is quite prolonged at times.

11. If in 24 hours there is no capsular swelling produced by 1:10 dilution of the patient's serum, another 50 mgm. of antibody nitrogen are given intravenously. Large initial serum dose is much more favorable than small repeated doses to total same amount.

12. Results with the above method of treatment: 50 patients, 35 per cent mortality.

13. The level of the spinal fluid sugar parallels the qualitative test for the specific soluble substance in the supernatant fluid and the patient's serum.

CSF Sugar (mgm./per cent)	*Mgm. Antibody Nitrogen Required*
0—20	100
20—30	75
30—40	50

The treatment of pneumococcic meningitis roughly parallels that for influenzal meningitis. 100 mgm. antibody nitrogen equals 100,000 units. Severe cases may require 200,000 units. Antibody treatment is necessary in all cases under two years, and the course is more prolonged with drugs alone.

THREE-YEAR MEDICAL COURSES

The Federation of State Medical Boards of the United States has endorsed the proposed accelerated course of medical education as a war measure. State boards of licensure and registration and deans of medical schools have been mailed a statutory description of medical schools from which present graduates are eligible for licensure. These moves were taken to help clarify questions concerning medical licensure of students who graduate from medical schools after three calendar years of training. Nine states have statutory provisions which must be modified before licenses can be granted to these three-year students. Sixteen states and the District of Columbia must liberalize existing statutory provisions.

Evaluation of Relative Importance of Various Etiological Factors in Asphyxia Neonatorum* **

A Study of 56 Cases Occurring in 1000 Consecutive Deliveries

Arthur J. Moss, M.D.
Minneapolis, Minnesota

ASPHYXIA neonatorum has recently assumed a significant position in both the experimental and clinical fields of medicine. Although numerous contributions have been made, the etiology of this condition is still vague. The studies of Rosenfeld and Snyder,[1,2,3,4] suggesting that respirations begin early in prenatal life, offered some hope of obtaining a more complete understanding of the processes concerned in the production of asphyxia neonatorum. More recent observations have led to a diminution of the earlier enthusiasm exhibited over their hypothesis. Windle's[5] studies indicate that respiratory movements do not normally occur in utero but result from the anoxia coincident with birth. Similar observations were previously made by Barcroft.[6,7] The mechanism of the onset of respiration in newly born infants must still be considered obscure. Moreover, until this mechanism is definitely understood, the various etiological factors concerned in the production of asphyxia neonatorum must also remain obscure.

It has been generally accepted that asphyxia at birth exerts its deleterious effects through the agency of anoxia, the latter being present either as the cause or result of asphyxia.[8] Therefore, it seems reasonable to assume that any condition which produces histotoxic, anoxic, anemic, or stagnant anoxia in either the mother or fetus may contribute towards asphyxiation of the infant.[9] In an attempt to ascertain the relative importance of such conditions, the present study was undertaken three years prior to this writing. Since that time, the studies of Cole, Kimball and Daniels[10] have been presented. Their results offer strong evidence that certain factors present prior to or at the time of birth may unfavorably influence the spontaneity of respirations in the newly born infant. The results of the present study bear a striking similarity to theirs and are offered as further confirmatory evidence.

One thousand consecutive deliveries were observed at the Minneapolis General Hospital, where the obstetrical service is closely supervised by a permanent senior staff. Each infant was carefully observed at the time of delivery. Any baby failing to breathe at birth and requiring any form of resuscitation other than the routine measures of warmth, gentleness, and aspiration of mucus was classified in the group with asphyxia. It was believed that cyanosis prolonged for more than one minute was definitely abnormal and in a large series of cases should serve as a dependable guide for estimating the number of infants suffering from an anoxic condition.

Observations relating to the mother were also made in each case. Her age and state of health as well as the parity and the duration of labor were all recorded. Data were also collected concerning the type, depth, and duration of anesthesia, the incidence of breech presentations, posterior positions, cord complications and instrumental deliveries. The results were tabulated, and the relationship of these factors to asphyxia and cyanosis was determined. Oxytocic drugs were in no instance administered to the mother before delivery. Sedatives and hypnotics were used in a few cases only. Their effects could, therefore, not be studied statistically.

RESULTS

The results are summarized in graphic form in Figure 1. Cyanosis was observed in 28.4 per cent of the 1000 infants, 5.6 per cent being sufficiently apneic at birth to require some form of resuscitation. Of the 56 apneic babies, 6 never breathed, and 11 expired subsequent to the onset of respirations—a total of 17 fatalities.

MATERNAL FACTORS

Parity. The incidence of anoxia and asphyxia was found to be greater in babies born of primiparous mothers. Of 297 first born infants, 110 (37.8 per cent) showed some degree of cyanosis. Resuscitation was necessary in 24 (21.8 per cent) of the anoxic babies. The 703 infants born of multiparous mothers were cyanotic in only 174 instances (24.8 per cent), associated apnea being observed in but 32 (12.6 per cent) of the latter.

Age of Mother. The age of the mother, irrespective of her parity, was definitely related to the frequency with which cyanosis and asphyxia occurred in the infant. Babies born of mothers under twenty years of age were the most likely to suffer from anoxia or asphyxia at birth. In this group of 146 infants, 49 (34.5 per cent) showed cyanosis, 10 of which (20.4 per cent) required some form of resuscitation. Infants whose mothers were between 25 and 30 years of age were the most fortunate. In this group, cyanosis was observed at birth in but 60 of the 244 infants (24.6 per cent), only 11 of the anoxic babies (18 per cent) being apneic at birth.

Health of Mother. Impairment of the mother's health is considered to be an important factor in the production of anoxia and apnea neonatorum. This is especially true in those conditions in which the functions of her respiratory and circulatory systems are impaired. In this series, none of the latter conditions were encountered. Premature separation of the placenta occurred three times

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*From the Minneapolis General Hospital and the department of pediatrics, University of Minnesota.

**Submitted to the Graduate School of the University of Minnesota in partial fulfillment of the requirements for the degree, Master of Science in Pediatrics, March, 1942.

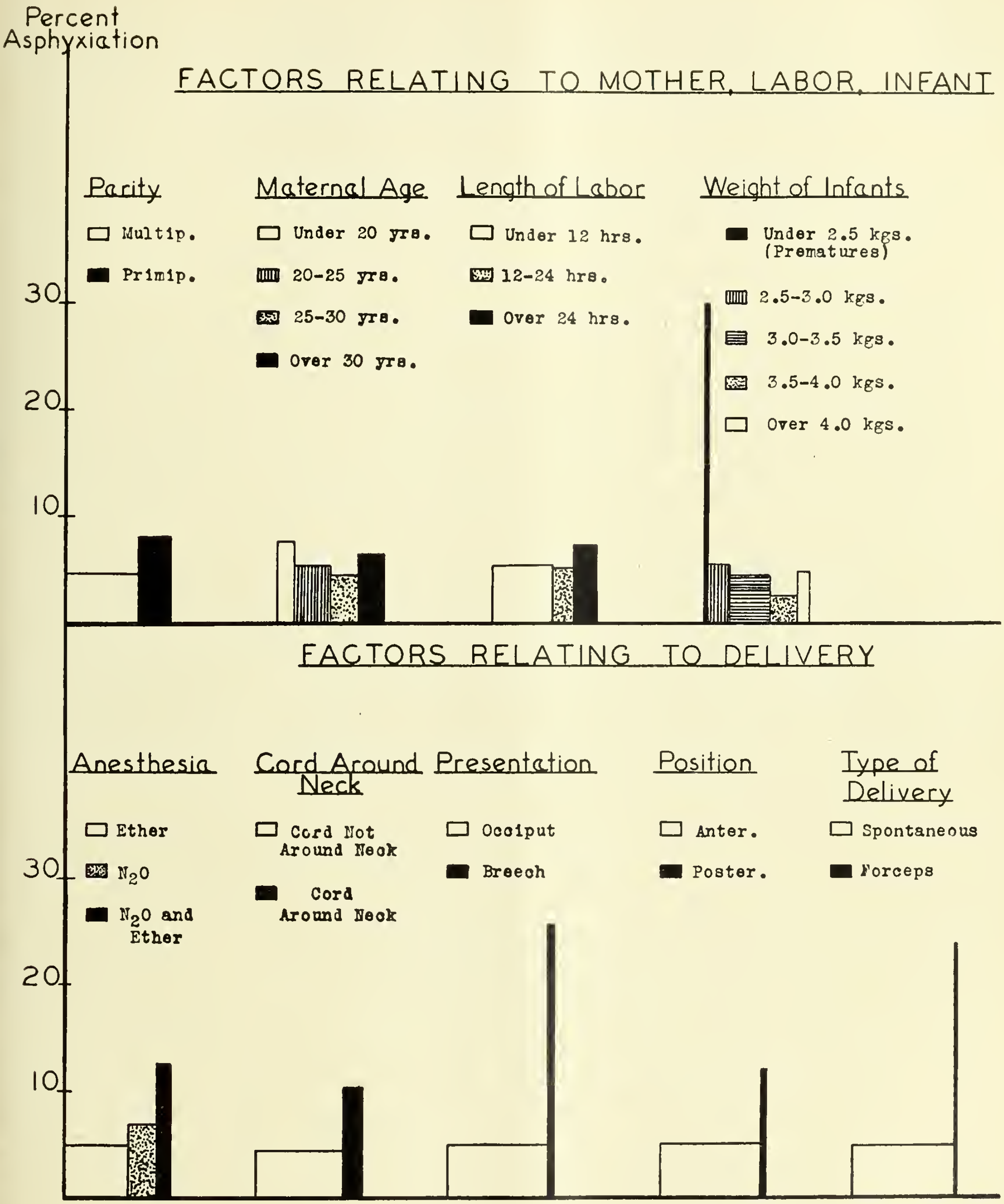

Fig. 1. A comparison of the influence of various etiological factors on the incidence of apnea neonatorum in 56 cases observed in connection with a study of 1000 deliveries. The ordinate represents the percentage of infants asphyxiated, each vertical square being equivalent to 2 per cent. The abscissa represents the number of infants included in each group, one horizontal square being equivalent to 200 infants.

and placenta previa once. All four infants were cyanotic, but none were apneic at birth. Pre-eclamptic toxemia was present in twelve instances. Three of the babies born of the affected mothers were anoxic, and a fourth, which was delivered by cesarean section, was apneic.

Factors Relating to Labor

It is generally believed that labors which are long and difficult often terminate in the delivery of a cyanotic or apneic baby. In the present series of patients, labor was prolonged for more than 24 hours in 116 instances. The incidence of both anoxia and asphyxia was increased in the infants of this group. Cyanosis was present in 40 (30.5 per cent) of these babies, 9 of which (22.5 per cent) also were asphyxiated.

FACTORS RELATING TO DELIVERY

Several events occurring at the time of delivery may contribute to the production of anoxia and apnea neonatorum. In the present study, anesthesia, fetal presentations, twisting of the umbilical cord around the infant's neck, and instrumental deliveries were considered.

Effect of Anesthesia. Only thirty mothers of the total number studied were given no anesthetic prior to delivery. This group is obviously too small to offer a concrete standard for comparing the effects of maternal anesthesia on the newborn infant. The most important findings, as regards the influence of anesthesia, were those pertaining to the type of anesthetic used and the depth and duration of anesthesia. Ether and nitrous oxide, either alone or combined, were the anesthetic agents used in this study. Ether anesthesia was associated with the smallest proportion of cyanotic or apneic babies. Of 617 infants in this group, 147 (23.9 per cent) showed cyanosis, 25 of the latter (17.0 per cent) requiring some form of resuscitation. Nitrous oxide, when given to the mother, was found to be somewhat more conducive to the development of anoxia or asphyxia in the infant. There were 297 babies born of mothers given nitrous oxide anesthesia. Cyanosis was present in 104 of these (35.0 per cent), 20 of which (19.2 per cent) were also apneic. The greatest incidence of cyanosis and asphyxia occurred in infants born of mothers who were given nitrous oxide supplemented with ether anesthesia. Of 55 such infants, 23 (41.8 per cent) suffered from anoxia, 7 of the latter (30.4 per cent) requiring resuscitation.

Depth of Anesthesia. With the use of each of the three types of anesthesia, it was found that the deeper the level, the more frequently was the baby born in an anoxic condition. However, the spontaneity of respirations at birth was affected by the depth of anesthesia only when nitrous oxide was supplemented with ether. Nitrous oxide with ether was used for the purpose of analgesia in 23 cases. Only 2 (8.7 per cent) of the infants born of these mothers were anoxic, and none required resuscitation. When second stage anesthesia was reached (32 cases), 21 (65.7 per cent) of the infants showed cyanosis, 7 of which (33.3 per cent) required some form of resuscitation.

Duration of Anesthesia. Second stage anesthesia was in most cases maintained for less than five minutes. However, analgesia was administered for varying periods of time. It was found that, irrespective of the anesthetic employed, the incidence of anoxia and apnea neonatorum was directly proportional to the duration of maternal anesthesia.

Presenting Part and Position of Fetus. The belief that anoxia and asphyxia are more frequently encountered in babies born with the breech presenting or in a posterior position is well supported by the observations presented in Figure 1. In this series, there were 35 breech deliveries. Cyanosis was observed in 18 (51.5 per cent) of these infants, 9 of which (50.0 per cent) were also apneic. Of 964 occiput presentations, only 265 (27.6 per cent) infants were anoxic, associated apnea being present in but 46 (17.3 per cent) of the latter. Fifty infants were delivered in the posterior position. Cyanosis was present in 19 of these (38.0 per cent), 6 of which (31.6 per cent) were also apneic. Of 949 infants born in the anterior position, 264 (27.8 per cent) were anoxic, only 49 (5.2 per cent) of the latter requiring resuscitation.

Cord Around Neck. Twisting of the umbilical cord around the neck of the infant has been recognized as a common cause of cyanosis and asphyxia at birth. In the present study, the cord was coiled about the neck of the infant in 177 cases. Anoxia was noted in 71 (40.1 per cent) of these babies, 18 of which (25.3 per cent) were also apneic. In the control group, consisting of 821 infants, cyanosis was present in only 211 (25.7 per cent), of which but 36 (17.1 per cent) required resuscitation. Prolapse of the umbilical cord was observed twice. Both infants were anoxic and apneic.

Instrumental Deliveries. Only one cesarean section was performed. The infant was anoxic at birth and required resuscitation. All other operative deliveries were limited to the application of forceps. These were used in 21 cases, 15 of the babies (71.4 per cent) showing cyanosis at birth. Resuscitation was necessary in 5 (33.3 per cent) of the anoxic infants. Cyanosis was observed in but 268 (27.4 per cent) of the 978 babies delivered spontaneously, and only 50 (18.7 per cent) of the anoxic infants failed to breathe at birth.

FETAL FACTORS

Prematurity is believed to be the most important factor causing asphyxia neonatorum. The results of the present study support this view. Fifty-three infants were born prematurely. Cyanosis was observed in 26 (49.0 per cent) of these, 16 of which (61.1 per cent) were apneic. Anoxia was also frequently present in infants weighing over 4000 grams at birth. Of 73 infants in this group, 41 (36.0 per cent) were cyanotic. However, only 6 (14.6 per cent) of these anoxic babies required resuscitation. This lack of correlation between anoxia and asphyxia becomes clear when one considers the course of events encountered in delivering a large baby. The difficulty in extracting the shoulders of the infant produces a superficial congestion of the face. If delivery is not too prolonged, the deeper structures, including the respiratory center, are not seriously impaired.

COMMENT

The effects of asphyxia are best explained on the basis of anoxia. It seems reasonable to assume that any condition which may cause anoxia may also produce asphyxia. However, until the cause of the onset of respirations at birth is established beyond dispute, the complete etiology of asphyxia neonatorum must remain hypothetical and the treatment empirical.

Clinical studies by Cole, Kimball and Daniels[10] have furnished convincing evidence that certain factors may contribute towards asphyxiation of the newly born infant. The present study confirms their observations. It should be noted that analgesic drugs were not discussed in this communication because such agents were not used in connection with the deliveries referred to. It was found in analyzing 1000 consecutive deliveries that prematurity, breech presentations, forceps deliveries, and nitrous oxide supplemented with ether anesthesia were associated with the greatest incidence of apnea neonatorum.

Summary and Conclusions

1. Data collected from 1000 consecutive deliveries were analyzed with the object of determining the relative importance of various factors contributing to the causation of asphyxia neonatorum. The factors considered were as follows: maternal age and health, length of labor, type, duration, and depth of anesthesia, fetal presentation, twisting of the umbilical cord about the neck of the infant, operative deliveries, and prematurity.

2. Cyanosis of some degree was observed in 284 infants. Resuscitation in one form or another was required in 56 of these.

3. Cyanosis and asphyxia were significantly more common in first-born babies and in those born of mothers under 20 years of age.

4. Prolongation of labor beyond 24 hours tended to increase the incidence of anoxia and asphyxia at birth.

5. The incidence of anoxia at birth was directly proportional to both the depth and duration of maternal anesthesia, irrespective of the type of anesthesia used.

6. Breech deliveries and posterior positions were found to be conducive to the development of anoxia or asphyxia in the infant.

7. Delivery by forceps resulted in a marked increase in the incidence of anoxia and apnea neonatorum.

8. Twisting of the umbilical cord around the neck of the infant was the apparent cause of anoxia and apnea at birth in a relatively large percentage of cases.

9. The marked influence of the complications of pregnancy on the occurrence of anoxia in newborn infants, as observed by other workers, was confirmed.

10. Prematurity of birth was found to be the most significant single cause of anoxia or apnea neonatorum.

Bibliography

1. Rosenfeld, M., and Snyder, F. F.: Stages of development of respiratory regulation and changes occurring at birth, Am. J. Physiol. 121:242, 1938.

2. Rosenfeld, M., and Snyder, F. F.: Fetal respiration in rabbit, Proc. Soc. Exper. Biol. & Med. 33:576, 1936.

3. Snyder, F. F., and Rosenfeld, M.: Direct observation of intra-uterine respiratory movements of fetus and role of carbon dioxide and oxygen in their regulation, Am. J. Physiol. 119:153, 1937.

4. Rosenfeld, M., and Snyder, F. F.: Factor of anesthesia in pathogenesis of asphyxia neonatorum, Am. J. Obst. & Gynec. 38:424, 1939.

5. Windle, W. F.: Physiology and anatomy of respiratory systems in fetus and newborn infant, J. Pediat. 19:437, 1941.

6. Barcroft, J.: Four phases of birth, Lancet 2:91, 1941.

7. Barcroft, J.: Intra-uterine development of respiratory effort, Brit. M. J. 2:986, 1939.

8. Clifford, S. H.: Effects of asphyxia on newborn infant, J. Pediat. 18:567, 1941.

9. Schreiber, F.: Apnea of newborn and associated cerebral injury; clinical and statistical study, J.A.M.A. 111:1263, 1938.

10. Cole, W. C. C., Kimball, D. C., and Daniels, L. E.: Etiologic factors in neonatal asphyxia, J.A.M.A. 113:203, 1939.

NOTE: The author acknowledges with gratitude the coöperation of Dr. J. H. Simons and other members of the obstetrical staff of the Minneapolis General Hospital throughout the course of this investigation.

DECONTAMINATION OF EYES AFTER EXPOSURE TO LEWISITE AND MUSTARD

Since publication of the Office of Civilian Defense handbooks, "First Aid in the Prevention and Treatment of Chemical Casualties" and "Protection Against Gas," further experience has shown that the 2 per cent solution of hydrogen peroxide recommended for the treatment of eyes following Lewisite burns may be injurious if used undiluted. The Chemical Warfare Service now recommends a single instillation in the eyes of a 0.5 per cent solution of hydrogen peroxide as soon as possible after contamination with Lewisite. This solution may be prepared by diluting one part of a 2 per cent solution with three parts of water, or one part of a 3 per cent solution with five parts of water. The solution usually found in drugstores is the U. S. P. strength of 2.5 to 3.5 per cent hydrogen peroxide. A 0.5 per cent solution of potassium permanganate has also been found effective as an eye instillation following exposure to Lewisite.

In planning decontamination stations, the Medical Division, Office of Civilian Defense, recommends that provision be made near the entrance of the second or shower room for the irrigation of the eyes of contaminated persons. The schematic sketch of a decontamination station in the Office of Civilian Defense publications mentioned above shows the irrigation of eyes in the dressing room, whereas this should be carried out in the second or shower room before the bath is given. Delay until the casualty reaches the dressing room will result in more serious injury to eyes which have been contaminated with mustard or Lewisite.

Recent Observations on Hay Fever in Children[*]

Albert V. Stoesser, M.D.
Minneapolis, Minnesota

ALTHOUGH much has been written concerning hay fever or seasonal pollinosis, physicians still have difficulty with the treatment of this allergic disease. A lack of enthusiasm has developed. Children especially have been neglected, and many have not received proper treatment. It was not until 1932 that the hay fever patients attending the Pediatric Outpatient department of University Hospital, Minneapolis, Minnesota, received any form of specific therapy. From then on, various methods described in the medical literature and in the reports of commercial organizations supplying pollen extract were tried. Gradually some of the old procedures were discarded and new schedules were adopted. These resulted in a satisfactory relief for the majority of the children with seasonal pollinosis during the period of 1936 to 1941.

The symptoms of hay fever were found in about 20 per cent of the children reporting in the outpatient department with an allergic disease. There were more males than females. The onset occurred quite early in life. Although a few patients showed symptoms during their first year, a much larger number began to manifest signs in the second year and there was a rapid increase in the number of cases during the preschool period. However, the majority of the children did not come for treatment until they had attended school. The symptoms usually increased in severity during the school years, and the failure of the children to be in good condition in the fall of the year upon their return to school focused medical attention upon them, with the statistical results summarized in Table I.

TABLE I.
Age Incidence of the Children with Hay Fever Attending the University and Minneapolis General Hospitals from 1936 to 1941

Males—342 Females—71	Age at First Visit	Age at Onset
Below 1 year	0	3
1 to 5 years, inclusive	34	177
6 to 10 years, inclusive	176	154
11 to 15 years, inclusive	203	79
Total	413	413

For all the children the determination of seasonal pollinosis included the cutaneous tests with the sixteen groups of pollens which have been prepared by Ellis and Rosendahl of the University of Minnesota, as follows:

1. Maple (box elder) - Aceraceal
2. Birch - Beutlaceae
3. Poplar - Willow - Salicaceae
4. Elm - Nettle - Urticaceae
5. Sedge - bulrush - Cypereceae
6. Ash - Oleaceae
7. Oak - Fagaceae
8. Grass - Gramineae
9. Walnut - Juglandaceae
10. Plantain - Plantaginaceae
11. Dock-sorrel - Polygonaceae
12. Alfalfa - Leguminosae
13. Pigweed - Amaranthaceae
14. Russian Thistle - Chenopodiaceae
15. Sage - wormwood - Compositae
16. Ragweed - Ambrosiaceae.

The pressure-puncture method was employed. A drop of n/10 sodium hydroxide was placed on the cleansed skin of the forearm. A small amount of the dried pollen mixtures was stirred into the drop by means of a toothpick. Two to four punctures were made through each drop. Four hundred and thirteen children were tested and the results are shown in Table II.

TABLE II.
Number of Positive Cutaneous Reactions to the Pollen Groups in 413 Children with Hay Fever

1.	Maple (Box Elder)	69	9.	Walnut	33
2.	Birch	23	10.	Plantain	24
3.	Poplar—Willow	55	11.	Dock—Sorrel	39
4.	Elm—Nettle	38	12.	Alfalfa	58
5.	Sedge—Bulrush	30	13.	Pigweed	115
6.	Ash	65	14.	Russian Thistle	146
7.	Oak	54	15.	Sage—Wormwood	209
8.	Grass	72	16.	Ragweed	306

The following interesting observations were made in connection with the cutaneous testing:

1. A few of the patients gave no definite positive reactions to the pollens. The majority of these cases were found to have had clinical symptoms for only one year. In some instances, the child's own serum was injected into his skin, and the tests were reapplied. Positive reactions then appeared indicating that the skin of these individuals had not yet become sensitive in the natural way.

2. Many of the younger children showed relatively small cutaneous reactions, but these were considered as positive since they were larger than the control test. Specific treatment based on the tests yielded favorable results.

3. There were patients who gave marked positive reactions to the tree and grass pollens and small areas of erythema to the weeds. Some of these children had symptoms only during the season when ragweed pollinates.

4. The sage-wormwood mixtures occasionally produced a large wheal surrounded by an extensive area of erythema which engulfed the adjacent ragweed pollen reaction. These children responded well to treatment with a pollen extract containing little sage-wormwood and much ragweed.

5. The grass pollen mixture gave a marked positive reaction in a few patients. The test was of no clinical

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[*] From the department of pediatrics, University of Minnesota.

TABLE III.
Dosage Schedule for Specific Pollen Therapy

			CLASS A			CLASS B			CLASS C			CLASS D		
Dose No.	Date	Multiple of First Dose	Solution No.	Dose in cc.	Dose in Units	Solution No.	Dose in cc.	Dose in Units	Solution No.	Dose in cc.	Dose in Units	Solution No.	Dose in cc.	Dose in Units
1		1	2	.05	5	2	.1	10	2	.2	20	3	.05	50
2		2	2	.1	10	2	.2	20	2	.4	40	3	.1	100
3		4	2	.2	20	2	.4	40	2	.8	80	3	.2	200
4		7	2	.35	35	2	.7	70	3	.14	140	3	.35	350
5		10	2	.5	50	3	.1	100	3	.2	200	3	.5	500
6		15	2	.75	75	3	.15	150	3	.3	300	3	.75	750
7		20	3	.1	100	3	.2	200	3	.4	400	4	.1	1000
8		30	3	.15	150	3	.3	300	3	.6	600	4	.15	1500
9		40	3	.2	200	3	.4	400	3	.8	800	4	.2	2000
10		60	3	.3	300	3	.6	600	4	.12	1200	4	.3	3000
11		80	3	.4	400	3	.8	800	4	.16	1600	4	.4	4000
12		100	3	.5	500	4	.1	1000	4	.2	2000	4	.5	5000
13		120	3	.6	600	4	.12	1200	4	.24	2400	4	.6	6000
14		160	3	.8	800	4	.16	1600	4	.32	3200	4	.8	8000
15		200	4	.1	1000	4	.2	2000	4	.4	4000	5	.2	10000
16		240	4	.12	1200	4	.24	2400	4	.48	4800	5	.24	12000
17		300	4	.15	1500	4	.3	3000	4	.6	6000	5	.3	15000
18		360	4	.18	1800	4	.36	3600	4	.72	7200	5	.36	18000
19		420	4	.21	2100	4	.42	4200	4	.84	8400	5	.42	21000
20		500	4	.25	2500	4	.5	5000	5	.2	10000	5	.5	25000
21		500	5	.05	2500	5	.1	5000	5	.2	10000	5	.5	25000

significance. On the other hand there were children with weak cutaneous reactions to grass pollen, who required specific treatment with the grass pollen extract.

6. The most favorable results from the skin testing were obtained during the winter months.

Three hundred and ten children were chosen for specific pollen therapy. Each treatment set was prepared in the University Hospital's pharmacy and consisted of four dilutions of a pollen extract designed especially for the patient for whom it was prescribed. The pollen extract contains many active substances, all of which are of complex chemical natures. Some of the substances contain much carbohydrate and others resemble protein. They are inactivated by heat and alkaline media. They are slowly inactivated in the presence of proteolytic enzyme. The pollen extract cannot be identified definitely with any one nitrogenous constituent but the specific activity of fresh pollen extract closely parallels the total nitrogen content which therefore can serve as a reliable indirect criterion in the standardization. One unit represents the quantity of pollen extract containing 0.00001 milligrams of total nitrogen. It is the unit referred to in the Ellis dosage table. Solution No. 2 was the weakest and solution No. 5 was the strongest. Solution No. 1 was not furnished with the set since this high dilution was only employed occasionally in determining the reaction of the patient to the extract by cutaneous testing. This testing was accomplished by adhering to the following rules formulated by Ellis:

Step 1. Using a tuberculin type syringe, inject intradermally on the flexor surface of the forearm approximately .02 cc. of Solution No. 2.

Step 2. At the end of 15 to 20 minutes observe the reaction and classify the sensitivity according to table below:

Classification of Sensitivity

	Sol. 1	Sol. 2	Sol. 3	Sol. 4
Concentration cc. Mg. Nitrogen	.0001	.001	.01	.1
Sensitivity Classification	Degree of Reaction			
A	Marked	Marked +		
B	Moderate	Marked	Marked +	
C		Moderate	Marked	
D			Moderate	Marked or Moderate

A marked reaction is characterized by distinct pseudopod formation rendering the outline of the wheal irregular, and is normally 1 to 2 centimeters in size. Such a reaction with Solution 2 indicates a Class B sensitivity.

A marked plus reaction differs from a marked reaction only in size, spreading over a larger area. This type of reaction to Solution 2 indicates a Class A sensitivity.

A reaction is considered moderate when there is definite increase in the size of the wheal produced by the intradermal injection, the outline remaining smooth. This type of reaction to Solution 2 indicates a Class C sensitivity.

If in doubt as to classification of patient as A or B sensitivity, a test dose of strength Solution 1 may be prepared (extemporaneously) by diluting .1 cc. of Solution 2 in a tuberculin syringe to 1 cc. with sterile normal saline. If in doubt as to classification B or C, apply the test with Solution 3. If no marked reaction is obtained with Solution 3, apply test with Solution 4; a marked reaction with this strength, when such reaction has not been obtained with a weaker dilution, indicates a Class D sensitivity."

After arriving at a sensitivity classification the inoculations were started with the amounts suggested for the class of patient in Table III.

As more and more cases were treated, important information concerning the specific therapy was collected and the salient facts may be listed as follows:

1. All pollen extracts were freshly prepared just before a special treatment set was made up for each patient. The importance of using fresh extract cannot be overemphasized.

2. The preparation of a proper combination of pollens required knowledge of the onset and duration of the child's hay fever symptoms, the list of pollens which are known to be prevalent in the atmosphere in the patient's locality during the season of illness, and the record of the positive skin test reactions to the pollens.

3. If too many different pollen groups were placed in a treatment mixture, the dilution of each pollen became so great, that no effective dose of the most important pollen could be given to the child.

4. Pollens which are not airborne such as dandelion and goldenrod were never added.

5. The child with spring hay fever usually had positive tests to more than one tree group. Mixing all of these groups in one treatment solution seldom gave good results.

6. Box elder, cottonwood, and oak produce much pollen and they therefore were most significant in preparing a tree pollen treatment set.

7. Birch, elm and ash if they did not give strong skin test reactions were omitted from the prescription.

8. Occasionally a child responded poorly to the tree pollen mixture employed for treatment. In such a case, a new combination was prepared the following year placing more emphasis on the trees which produce the most pollen.

9. Once the correct proportion of tree pollens was obtained in the treatment extract, the child gave a most satisfactory response. Hyposensitization then appeared to be quite easy.

10. The number of children reacting clinically to grass pollen was small. The cases were all fairly well controlled by an average number of preseasonal inoculations. The amount of relief, however, was not as high as in the cases of tree pollen sensitive patients.

11. The majority of the children who had pollinosis during the late summer were sensitive to ragweed. There were a few patients who did not respond well to the therapy with the ragweed pollen mixture. They gave positive cutaneous reactions to the sage-wormwood group and when this was added to the treatment set, the results were better.

12. Many of the children who had positive skin reactions to pigweed, Russian thistle, sage-wormwood and ragweed were relieved by treatment with a mixture of sage-wormwood and ragweed but there were some who responded only to inoculations with an extract containing pigweed and Russian thistle. The ragweed could be omitted.

13. The fifteen dose schedule recommended by commercial organizations did not give good results. The children required 25 to 35 inoculations which were usually started in the late winter or early spring.

14. The maximum number of pollen units attained in the dosage schedule of Class A was usually not large enough to give optimum results and therefore it was necessary to move over into the schedule of Class B or C. This could be done easily if an early start had been made with the inoculations.

15. All injections were made into the subcutaneous tissue from which absorption is relatively slow. The intradermal method was not permitted on account of the danger of too rapid absorption.

16. Epinephrine was not employed routinely along with pollen extract inoculations because investigations have shown that it causes a delay of about 20 minutes in absorption after which the rate is only slightly slower than without the drug.

17. Constitutional reactions were few in number. When they did occur, the following were considered:

> There may be a fixed limit of tolerance which has been present for many years. A constitutional reaction can be induced repeatedly in the child at about the same dosage level. No attempt should be made to increase the amount injected beyond this point.
>
> The change from a large volume of a weaker extract to a small volume of a stronger extract.
>
> The use of too concentrated extracts, too frequent injections, too large an increase in dose, errors in dosages, too large an initial dose and improper technic of administration.

18. The patient's limit of tolerance was judged not only by the development of a constitutional reaction but also by the occurrence of marked local reactions at the site of injection, evidenced by pain, swelling, and erythema. Minor reactions were ignored but reactions of a marked degree indicated a reduction or repetition of the last dose, or the use of a longer period between injections or both.

19. When persistent efforts to increase the number of pollen units failed because of constitutional or severe local reactions, weekly inoculations of the tolerated amount of the pollen mixture were made in hopes of giving the child a reasonable degree of protection. Some of the children were benefited by doses which were quite small in comparison with the average.

20. The severity of the hay fever regularly experienced by the patients was not a trustworthy guide as to the size of the dose of the pollen antigen that was tolerated. Some children who had severe attacks of seasonal pollinosis were relatively tolerant and could take larger doses, whereas others who had less severe hay fever were more sensitive to the pollen extracts.

21. There were indications that a better guide as to the size of the dose was the reaction to the cutaneous tests. Children who exhibited the most markedly positive skin tests were unable to tolerate the large doses of the usual treatment series of injections while on the other hand those showing weak reactions tolerated and actually required the large doses of the pollen antigen.

22. In every instance, complete relief was obtained when the "top-dose" was reached three to four weeks before the hay fever season and then continued until its onset.

23. Rapid preseasonal or co-seasonal methods were not adopted chiefly because these forms of therapy were not successful in children observed by other investigators. If one must start late he must be satisfied with a moderate maximum dose and the consequent partial protection. Large increases of injected pollen extract should not be made after the child is inhaling large amounts of the offending pollen. Too much treatment at the wrong time may destroy much of the tolerance already built up by the preseasonal effort.

24. Practically all the patients received treatment throughout the hay fever season. The dose of the pollen mixture was reduced one-half or more and it was during this period of treatment that some of the patients received epinephrine along with the inoculations.

25. There were children who, although they were being given small doses during the hay fever season, would have done better without treatment but the injections were continued in order to lead on to the perennial therapy. Pollen filters in the bedroom windows often helped in this situation.

26. Frequent cold days during the late summer resulted in many instances in a persistent nasal congestion with resultant nasal obstruction but very little irritation. Sensitiveness to cold air seemed to play a part in these patients.

27. The response to the weed pollen mixtures as shown in Table IV was almost as satisfactory as that to the tree pollens and better than to the grass pollen group. The cases which did not receive complete relief were analyzed and one or more of the following conditions was considered the cause of the failures:

> Complication of the hay fever by food or house dust sensitivity.
>
> Omission of one of the causative pollens.
>
> Underdosage.
>
> Long duration of the hay fever. Children with a history of two to four years of seasonal pollinosis yielded better results than those who have had the disease for over six years.
>
> Failure to employ the perennial regime.
>
> Natural resistance to hyposensitization. About 5 to 10 per cent of the pollen sensitive individuals are not helped by any known method of specific therapy.

Perennial treatment was carried out whenever possible after a successful season. The dose was reduced to one-fourth or one-half of the largest amount received before the hay fever season. The interval was lengthened to two or three weeks but not four weeks thereby avoiding any reactions. Interesting observations were made and they are as follows:

TABLE IV.

Results from the Injection Treatment of Specific Pollen Extract Mixtures in 310 Children with Hay Fever

Nine children received separate treatments for sensitivity to trees and weeds, and seven for sensitivity to grasses and weeds.

Long Preseasonal Therapy

	Trees		Grasses		Weeds	
	No.	Pct.	No.	Pct.	No.	Pct.
Good	19	79.2	7	36.8	115	59.0
Fair	2	8.3	8	42.1	61	31.3
Poor	3	12.5	4	21.1	19	9.7
Total	24		19		195	

Perennial Therapy

	Trees				Weeds	
	No.	Pct.			No.	Pct.
Good	6	100			49	59.8
Fair	0	—			17	20.7
Poor	0	—			16	19.5
Total	6				82	

1. If the injections were returned to a weekly basis and the dose gradually increased two months before the next expected hay fever season, the response was most satisfactory as is revealed in Table IV.

2. Coöperation had to be thorough. The parents brought the children to the clinic according to a definite schedule.

3. Cases with positive cutaneous reactions to many of the pollen groups did not respond favorably each year to the perennial therapy. It soon was discovered that there was a shifting sensitivity to the tree or the weed pollens, and the same treatment extract could not be used from one year to another in order to give the best relief.

4. Children successfully treated by the perennial method rarely had winter colds. There is so far no explanation for this.

5. After three or more years of perennial treatment the question came up as to whether it could be discontinued. At first it was thought that a decrease in the reaction of the skin tests might be an indication of an increasing resistance. However, there was no constant change. Some children revealed less positive cutaneous reactions after two or three years of therapy, others showed stronger positive skin tests. Those with the weaker reactions often required and could take higher doses the following year to secure optimum clinical results.

6. A few patients who received treatment over several consecutive seasons through puberty have since been able to get along satisfactorily without any specific therapy.

There have been numerous attempts to alter the standard pollen extracts so that larger doses could be given with fewer inoculations. The following modifications have received consideration but none has become popular:

1. Emulsion of the extract in lanolin and olive oil.
2. Alum precipitated pollen.
3. Tannic-acid-precipitated pollen—"pollen tannate."

4. Gelatin pollen extract mixture consisting of 4 parts of gelatin and 1 part of an aqueous extract of pollen.
5. A salt of active pollen substance avoiding thereby foreign matter such as oil, alum or gelatin.
6. A rapidly frozen aqueous pollen extract with the residue dissolved in sesame oil.

Oral pollen therapy has been recommended by many writers in spite of questionable results. The oral administration of pollen if it is successful has several advantages. It is more acceptable to many patients, especially children who do not like the idea of the needle. The dose can be taken when a visit to the physician is not convenient or possible for it is available when needed, nor is this form of therapy potentially as dangerous as is the inoculation method.

The allergic child receiving oral pollen is managed exactly as if he were being treated by the hypodermic method with the exception that the oral dose of pollen antigen is much larger than that which is given by injection. When the maximum doses are reached it is not necessary to administer the entire daily dose at one time but it may be taken several times a day in a divided form.

Thirty-six children ranging in age from 6 to 15 years of age were given oral pollen therapy. All the patients had positive cutaneous reactions to the ragweed pollen group and clinical symptoms of hay fever during August and September. In previous years these cases had responded favorably to the regular inoculation form of therapy. Panoral of Lilly was used. It is a whole pollen preparation which contains all the antigenic substances of the pollen grain. It is sterilized by a special method which does not alter the antigenic potency of the pollen. The sterile pollen mixed with food starch milled for thorough admixture is available in capsules in doses of 500, 2000, 8000, 30000 and 60000 units. Each capsule or pulvule is colored as a means of identification.

The dosage schedule which was employed is as follows:

FALL TYPE *PANORAL—Preseasonal*

Dose	Units	Pulvules (Filled Capsules) Color
1	500	1 pink
2	1,000	2 pink
3	1,500	3 pink
4	2,000	1 yellow
5	4,000	2 yellow
6	6,000	3 yellow
7	8,000	1 green
8	16,000	2 green
9	24,000	3 green
10	30,000	1 brown
11	60,000	2 brown
12	60,000	2 brown

The regular build-up doses were administered twice a week after a meal. The maintenance dose was continued throughout the hay fever season using 60,000 units daily in the majority of the cases but in some of the older children this was increased to 120,000 units.

Two of the patients had gastrointestinal reactions which were overcome by reducing the doses of oral pollen. One child developed urticaria. The results were not encouraging. Three of the cases had little hay fever but the remaining 33 children showed marked symptoms of seasonal pollinosis (Table V). Certainly the oral pollen therapy should not be offered as a substitute in patients who have already responded well to the hypodermic method.

The theory that the liberation of histamine in the tissues is the immediate cause of allergy led to the use of its antagonist, the enzyme histaminase for the prevention and alteration of such diseases as hay fever. Twenty-one children between the ages of 5 and 13 were selected to receive the enzyme. All of these cases were known to have typical symptoms of hay fever beginning about the middle of August and lasting until frost and to give positive skin test reactions to the ragweed pollen group. At the first signs of seasonal pollinosis, the histaminase was started. Torantil of Winthrop was used. It is a fluffy grayish or yellowish, slightly hydroscopic powder consisting of fine and coarse particles, obtained from the mucosa of the small intestines and the kidneys of hogs. The powder is standardized biologically in histamine-detoxicating units, 1 unit being the amount which will inactivate 1 mg. of histamine hydrochloride during incubation at 37.5° C. for twenty-four hours. The drug is made up into 5 unit enteric coated tablets.

Each child was started with one tablet, three times daily before meals. After a few days the dose was increased to two tablets or 10 units, and in some of the cases another increase was made to three tablets or 15 units. All the patients took the medication well but continued to have hay fever during the season. Any fluctuation in the symptoms that did occur could be accounted for by an associated change in the pollen concentration of the atmosphere (Table V). Recently, the recommendation has been made to try the new histaminase tablet containing 10 units thereby giving the patient larger doses of the enzyme. This has not been done.

Potassium chloride and other potassium salts have been shown to relieve in some instances the symptoms of the common allergic diseases. The effectiveness of small doses of the salts has been so striking at times that it has led to the belief that the potassium ion is intimately related to the problem of allergy. Bloom of Tucson has treated a group of individuals with simple seasonal pollinosis. He has felt that the potassium chloride was beneficial in the majority of the cases.

Here in the pediatric allergy clinics, the potassium salts have been tried in many of the young children with hay fever who have reported too late for specific pollen therapy. Forty-three patients ranging in age from 3 to 10 years were given potassium chloride. Each child received one 5 grain tablet three times daily after meals. The tablet was dissolved in one-half of a glass of cool water or a fruit juice such as grape juice and the mixture was slowly sipped. Drinking it too rapidly often causes nausea, abdominal distress, and even vomiting. In some of the older children of the group, the dose was increased to two tablets or 10 grains.

Eight of the patients were unable to continue the treatment for more than one week. They refused the medication because of nausea. The remaining 35 cases gave more encouraging results than had been expected. Nineteen children were relieved throughout the hay fever season to such an extent that the parents were pleased. Sixteen patients failed to respond satisfactorily (Table V). All of these cases were placed on a low sodium chloride diet in conjunction with the potassium chloride therapy before the ragweed pollen season had ended. Improvement followed in only a few instances. However further studies are indicated.

TABLE V.

Results from Various Forms of Non-Specific Treatment in 103 Children with Ragweed Pollen Sensitivity

	Oral Pollen		Torantil		Potassium Chloride		Coli Metabolin	
	No.	Pct.	No.	Pct.	No.	Pct.	No.	Pct.
Good	—	—	—	—	—	—	—	—
Fair	3	8.6	—	—	19	44.2	—	—
Poor	33	91.4	21	100	24	55.8	3	100
Total	36		21		43		3	

Eight children were unable to continue this form of therapy for more than one week.

Investigations with the product called Cold Metabolin of Tosse which consists of a filtrate of the Escherichia coli were reported by Elsbach in the June 15, 1941, issue of the *New York State Journal of Medicine.* The writer asserted that the metabolic products of the colon bacillus have a therapeutic value at least equal to that of specific inoculations in allergy. Shortly after this article appeared its context was reproduced in *Time Magazine* of June 30, 1941, and in Dr. Logan Clendenning's health column with the captions "Last Sniffle" and "New Hay Fever Remedy Tested Successfully." Immediately physicians became interested in trying the preparation. The author (A.V.S.) was able to obtain last summer enough material to treat as a clinical experiment three children with moderate ragweed pollen sensitivity. All of these cases failed to respond.

The product is being advocated for the treatment of allergic rhinitis, seasonal pollinosis, and bronchial asthma. Both the doctors and the public still are enthusiastic about it. However, in Current Comment of February 7, 1942, number of the *Journal of the American Medical Association* there appears the following concerning Coli Metabolin (Tosse):

"This preparation has been the subject of numerous inquiries received at the headquarters of the American Medical Association. The majority of the inquiries appear to have arisen as a result of articles in lay publications based on a short communication by Dr. Ernest J. Elsbach published in the *New York State Journal of Medicine.* From the Council report it may be inferred that critical investigators still consider the Elsbach article premature and unscientific since little evidence is presented to justify the enthusiastic attitude of the author. According to the Council, the composition and exact mode of action of Coli Metabolin (Tosse) are indefinite and the claims of the firm are not supported by available scientific evidence. Thus, Coli Metabolin (Tosse) has been declared unacceptable for inclusion in *New and Non-official Remedies.*"

Considerable attention has been focused recently upon the relation of fungus spores to allergic diseases of the respiratory tract. At times large quantities of windborne spores may be present in the air; fungus seasons similar to pollen seasons have been observed; cutaneous tests to fungi are often positive. The question as to how much symptoms of respiratory allergy are actually due to molds is still highly controversial.

Summary and Conclusions

1. The long preseasonal and perennial forms of specific pollen therapy still are the best treatments for hay fever in the child.

2. The oral administration of pollen did not give satisfactory results.

3. Enzyme therapy with histaminase (Torantil) failed completely.

4. The use of potassium chloride benefited enough children with seasonal pollinosis to warrant further investigation.

5. Coli Metabolin therapy appears to be of little value in the care of hay fever.

6. No conclusions can be reached concerning fungi or molds.

Pediatric Aspects of Endocrine Therapy*

Mildred R. Ziegler, Ph.D.
Arild E. Hansen, M.D.
Minneapolis, Minnesota

OUR knowledge of the glands of internal secretion in relation to clinical medicine seems to resolve itself into two phases, namely, the early period, when advances were made principally from clinical observations based upon physiologic and pathologic studies, and the more recent period, when biologic-chemical studies are contributing most to the progress being made. Many of the fundamental contributions made by the earlier investigators not only offered a new approach to our understanding of physiology, but also provided valuable and lasting methods of treatment for certain diseases of mankind. In the field of medicine, the significance of extracts of the pancreas, adrenal, thyroid, and parathyroid glands is today universally accepted, yet the neoteric reports of investigations in the field of these and other endocrine glands tend to leave one in a confused state as regards their direct and indirect relationship to the practice of medicine. Although this seems to be particularly true in the field of pediatrics, almost everyone interested in the diseases of children believes that from the mass of information being obtained, some pertinent findings will materialize which will be of value in the treatment of diseases of childhood. Such findings, which have shown that estrogenic substances are of value in the treatment of gonorrheal vaginitis in young girls and that gonadotropic material is of some use in cryptorchidism indicate that therapeutic applications of the newer hormonal substances are also becoming of importance in the field of pediatrics.

Obviously it would be a tremendous undertaking to review in any detail the clinical aspects of the newer knowledge of the endocrine glands. However, an outline prepared in skeletal form, featuring the pediatric phases of certain therapeutic preparations of possible significance might prove useful to the practitioner for orientation on the subject of hormonal therapy in children. This information, summarized from the current publications in the field of endocrinology and pediatrics; the recent books by Grollman; Allen, Danforth and Doisy; Hamblen; and Goldziehr, as well as from such sources as *New and Non-official Remedies,* and the *U. S. Pharmacopia,* is presented in the following tables.

TABLE I.—THYROID

Whole Thyroid and Its Active Principle Thyroxin
(Natural or Synthetic)

DESICCATED THYROID

Standardization: By weight; the U. S. P. standardized product contains 0.17—0.23 per cent iodine in thyroid combination.

Action: Affects pulse rate, blood pressure and nitrogen metabolism.

Indications for Use: Cretinism, hypothyroidism, myxedema, simple goiter (sometimes), obesity of Fröhlich's syndrome, myotonia congenita, low basal metabolism, osteochondral dysplasia (certain cases).

Clinical Use Controlled by: B. M. R., blood cholesterol, hormonal iodine in blood, creatin excretion, bound magnesium in blood, serum phosphatase, also by toxic signs such as tachycardia, nervous symptoms, fatigue and weight loss.

Administration and Dosage: Children—16, 32, 64, 128 mg.; adults—64 mg. one to three times daily.

Some Commercial Preparations: Thyroid tablets, thyroid extract, thyroid (desiccated).

THYROXIN

Standardization: By weight in mg.; 1 mg. synthetic thyroxin is therapeutically equivalent to 194 mg. of desiccated thyroid.

Action: Same as for desiccated thyroid.

Indications for Use: Same as for desiccated thyroid.

Clinical Use Controlled by: Same as for desiccated thyroid.

Administration and Dosage: Orally or parenterally (when not absorbed quantitatively may be used intravenously). Children less than adult dose, which is 0.2—2:0 mg.; infants with myxedema 0.2—0.4 mg.

Some Commercial Preparations: Thyroxin, thyroxin fraction (partially purified disodium salt of thyroxin).

TABLE II.—PARATHYROIDS

Parathyroid Gland Extract and Related Synthetic Compounds

SOLUTION OF PARATHYROID

Standardization and Unit: One unit = 1/100 of amount required to raise serum Ca of normal dogs 1 mg. within 16—18 hours after administration.

Action: Lowers renal threshold for PO_4, decreases serum PO_4, increases serum Ca and lowers excretion of PO_4 and Ca.

Indications for Use: Hypoparathyroidism (postoperative and idiopathic), removal of foreign metals stored in bone (important in lead poisoning), infantile tetany, nephrosis (to help remove edema).

Clinical Use Controlled by: Serum Ca determination or by testing the urine with Sulkowitch's reagent. May be dangerous when used for the tetany associated with infantile rickets; additional calcium should be given. If hypercalcemia develops, discontinue.

Administration and Dosage: For children, initially 0.1—0.2 cc. (10—20 units); average adult dose, 0.2—0.4 cc. (20—40 units) every 12 hrs. for 5 or 6 days, never more than 10 days in succession. Treatment then discontinued for a week or two and resumed if necessary; action facilitated by low phosphate diet.

Some Commercial Preparations: Parathormone, parathyroid hormone, parathyroid extract, Paroidin.

DIHYDROTACHYSTEROL*

Standardization: By weight in mg. per cc.

Action: Essentially same as parathyroid solution; full effect not apparent until 48 hrs. and is cumulative.

Indications for Use: Most valuable in control of chronic hypoparathyroid tetany.

Clinical Use controlled by: Same as for solution of parathyroid, except is safer for use in infantile tetany.

Administration and Dosage: Available as solution in oil, 1 cc. containing 1.25 mg. crystalline dihydrotachysterol. Five to 15 mg. administered daily until blood Ca rises above the threshold of 7.5—9.0 mg.; reduce dosage to 1.25—5 mg. as soon as normal level is approached.

Some Commercial Preparations: Hytakerol, formerly known as Dihydrotachysterol (A.T.10).

*Vitamin D_2 (Calciferol) sometimes is used in a similar manner.

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*From the department of pediatrics, University of Minnesota.

TABLE III.—PANCREAS

Extract from the Islets of Langerhans

INSULIN

Standardization and Unit: Each unit = 0.125 mg. and 8 such units = 1 mg. of the international standard preparation of dry insulin hydrochloride.

Action: Lowers blood sugar, causes glycogen deposition in the liver of diabetic animals fed with carbohydrate, indirectly affects the fat metabolism of diabetic animals.

Indications for Use: Diabetes mellitus which cannot be controlled by dietetic treatment alone, non-diabetic malnutrition.

Clinical Use Controlled by: Sugar determinations in blood and urine.

Administration and Dosage: Depends upon age and severity of disease. In general, 1 unit is necessary for 1.5—2.0 gm. glucose in urine. Administered subcutaneously; in coma may be given intravenously.

Some Commercial Preparations: Insulin, Iletin.

PROTAMINE ZINC INSULIN

Standardization and Unit: Same as for insulin.

Action: Same as for insulin, except the blood sugar lowering action is prolonged; greatest effect is in 12—24 hours.

Indications for Use: Chief use in diabetic cases where regular insulin is unable to control same, also where relatively small amounts are required and a single daily injection may be sufficient.

Clinical Use Controlled by: Same as for insulin.

Administration and Dosage: Same as for insulin.

Some Commercial Preparations: Protamine zinc insulin, Protamine Zinc Iletin.

CRYSTALLINE INSULIN

Standardization and Unit: Same as for insulin.

Action: Same as for insulin.

Indications for Use: Same as for unmodified insulin, valuable for those allergic to beef and pork.

Clinical Use Controlled by: Same as for insulin.

Administration and Dosage: Same as for insulin.

Some Commercial Preparations: Iletin, zinc insulin crystals U 40; Insulin, zinc insulin crystals U 40.

TABLE IV.—ADRENALS

A. Adrenal Medulla—Active substance elaborated by medullary cells and prepared synthetically

LAEVO-EPINEPHRINE HYDROCHLORIDE, LAEVO-METHYL ANIMOETHANOLCATECHOL

Standardization: By weight in grams per 100 or 1000 cc. of solution.

Action: Stimulates myoneural junctions of sympathetic nerve endings and most nonstriated musculature, constricts blood vessels.

Indications for Use: Systemic: bronchial asthma, urticaria, hay fever, angioneurotic edema, anaphylaxis, serum sickness, shock, stimulant for premature and newborn infants, anesthetic accidents, nitritoid crisis after injection of arsphenamine, acute hypoglycemia. Local: Controlling hemorrhage, inflammation of the eye. Inhalation: asthma and hay fever.

Clinical Use Controlled by: Age of child, severity of condition, and clinical effects.

Administration and Dosage: Administered subcutaneously 0.2—1.2 cc. (1:1000); intravenous use rarely indicated; in oil for prolonged effects in asthma and hay fever. Local: (1:1000 sol.). Inhalation: (1:100 sol.) in atomizer for asthma and hay fever.

Some Commercial Preparations: Adrenalin, Adrin, epinephrine, Epinine, Supranephrin, Suprarenalin, Suprarenin.

B. Adrenal Cortex—Active substance elaborated by cortical cells and certain fractions prepared synthetically

ADRENAL CORTICAL HORMONE

Standardization and Unit: No official method. The rat unit is based on survival of adrenalectomized rats; the dog unit on the maintenance of a normal nitrogen level. One rat unit = approximately 20—40 dog units.

Action: Affects many tissues of body, especially as regards water, electrolytes and carbohydrate metabolism.

Indications for Use: Addison's disease, burns, operative recovery, pseudo-pneumonia of newborn, surgical shock, chronic hypoadrenia, Waterhouse-Frederickson syndrome (adrenal hemorrhage), myasthenia gravis.

Clinical Use Controlled by: Blood pressure; serum electrolytes (Na, K and Cl), depending upon condition treated; clinical response.

Administration and Dosage: Governed by preparation used and individual needs. Suggested dosage for Addison's disease, 1—10 cc. daily, depending on clinical response; action may be facilitated by high Na, low K diet.

Some Commercial Preparations: Adrenal cortex extract, Adrenocortin, Cortalex, cortin, Eschatin, Interrenin, suprarenal cortex extract.

DESOXYCORTICOSTERONE ACETATE

(a related synthetic preparation)

Standardization: By weight in mg. per cc.

Action: Concerned with electrolyte and water balance; induces hypertension and cardiac decompensation.

Indications for Use: Addison's disease, burns, myasthenia gravis.

Clinical Use Controlled by: Serum Na and K, blood pressure.

Administration and Dosage: Parenteral injection, sublingually (dissolved in propylene glycol); pellet implantation. Under special conditions in Addison's disease it is necessary to give attention to the Na · K content of the diet to prevent toxic symptoms from overdosage.

Some Commercial Preparations: Cortate, Doca, Percortin.

TABLE V.—PITUITARY

A. Posterior Lobe—whole gland extracts and fractions

SOLUTION OF POSTERIOR PITUITARY

Standardization and Unit: One I. U. is activity, oxytocic or pressor, of 0.5 mg. of standard powdered posterior pituitary. The U.S.P. solution is standardized for oxytocic activity and usually 1 cc. contains 10 I. U., while "surgical" contains 20 I. U. per cc.

Action: Same as for Pitocin and Pitressin combined (see below).

Indications for Use: Diabetes insipidus, intestinal paresis, meteorism, urinary suppression, to aid in diagnosis of epilepsy, surgical shock, pulmonary hemorrhage, menorrhagia, nocturnal enuresis.

Clinical Use Controlled by: Blood pressure, water intake and output, body weight and clinical effects (vomiting, diarrhea). Contraindicated in the following conditions: hyperthyroidism, nephritis, myocarditis, hypertension.

Administration and Dosage: Infants, 1 I. U. (0.1 cc.); children, 2—5 I. U. (0.2—0.5 cc.)—both subcutaneously. For diabetes insipidus, begin with small amount and increase daily. Also applied locally to nasal mucous membranes.

Some Commercial Preparations: Hypophysin, Infundin, pituitary extract, pituitary liquid, pituitary solution, Pituitrin.

PITOCIN

(alpha-hypophamine)

Standardization and Unit: 10 I. U. of oxytocic activity per cc. and relatively free from pressor substances.

Action: Stimulates uterine contraction in labor, shortens coagulation time, does not increase blood pressure.

Indications for Use: No special indications in pediatrics.

Clinical Use Controlled by: Clinical effects.

Some Commercial Preparations: Pitocin.

PITRESSIN

(beta-hypophamine)

Standardization and Unit: 20 pressor units per cc. and relatively free from oxytocic principle.

Action: Stimulates heart and blood vessels by peripheral action, producing gradual rise in blood pressure lasting longer than adrenalin action; stimulates intestinal musculature; increases peristalsis, prevents excessive loss of water from body tissues.

Indications for Use: Diabetes insipidus, diagnostic test for epilepsy, urticaria, angioneurotic edema, postoperative or paralytic flatulence, intestinal atony, atonic constipation, ischuria paradoxa, hypotension of shock, nocturnal enuresis.

Clinical Use Controlled by: Same as for solution of posterior pituitary.

Administration and Dosage: Initially 5—10 I. U. (0.2—0.5 cc.) intramuscularly or subcutaneously (not intravenously), repeat as indicated; intranasally by spray, pledget or jelly; in oil (for prolonged effect), intramuscularly or subcutaneously.

Some Commercial Preparations: Pitressin, Pitressin tannate in oil.

B. Anterior Lobe—whole gland extract and fractions

ANTERIOR PITUITARY EXTRACT

Standardization: No standard for whole gland extract.

Action: The whole gland extract combines the actions of the individual factors.

Indications for Use: Pituitary cachexia or Simmond's disease, pituitary dwarfism, infantilism.

Clinical Use Controlled by: Clinical experience too limited to form any opinions.

Administration and Dosage: Varies with preparation used.

Some Commercial Preparations: Prephysin, Polyansyn.

GROWTH FACTOR

Standardization and Unit: Rat unit = total quantity given twice daily subcutaneously for 10—15 days into rats weighing 80—120 gm. causing an increase in body weight of 1 gm. per day.

Action: Somatic development.

Indications for Use: Gigantism, pituitary dwarfism, infantilism.

Clinical Use Controlled by: Clinical observations.

Administration and Dosage: Varies with preparations used.

Some Commercial Preparations: Antuitrin-growth factor, Growth complex.

THYROTROPIC FACTOR

Standardization and Unit: 1 I. U. = the activity of 0.25 mg. of the standard. Guinea pig unit = amount given daily for 5 days which will cause thyroids of immature guinea pigs to attain weight of 60 mg. (Rowlands and Parks). Rat unit = minimal amount given daily in 2 injections which will cause a rise of 20 per cent in the metabolism of the hypophysectomized rat by the 4th day (Collip).

Action: Necessary for normal thyroid development and function. If present in excess produces hyperplasia of thyroid with hyperthyroidism in both the rat and guinea pig.

Indications for Use: No clinical use known.

Some Commercial Preparations: Thyrotropic factor.

LACTOGENIC FACTOR
(prolactin)

Standardization and Unit: I. U. = 0.1 mg. of standard assayed by the pigeon crop response.

Action: Produces lactation in mammals and possibly plays a role in mammary gland proliferation; induces secretion of crop milk in pigeons.

Indications for Use: Insufficient milk secretion (questionahle success).

Clinical Use Controlled by: Clinical observations.

Administration and Dosage: Varies with preparation used.

Some Commercial Preparations: Prolactin.

CORTICOTROPIC FACTOR

Standardization and Unit: Rat unit = amount necessary to cause an increase of 50 per cent over the adrenal weight of controls when injected into 21 day old male rats in 3 doses over a period of 3 days (Moon).

Action: Functions in conjunction with the adrenal gland.

Indications for Use: No known clinical use.

Some Commercial Preparations: Adrenotropic factor.

GONADOTROPIC FACTOR

Standardization and Units: Follicle stimulating hormone (F.S.H.): rat unit = amount injected twice daily into rats 21 days old for 3 days, which will produce from 50 to 100 per cent increase in weight of the ovaries. Luteinizing hormones (L.H.): rat unit = amount which when combined with 2 R. U. of F.S.H. and injected into immature rats 21 days old, twice daily for 4 days, will produce 100 per cent augmentation in the weight of the ovaries over that produced by F.S.H. alone.

Action: F.S.H.: stimulates growth and maturation of the ovarian follicles, hinges on the changes characteristic of esterus; L.H.: causes luteinization of the ovarian follicles.

Indications for Use: For gonadotropic effects, the chorionic gonadotropin is preferred.

Clinical Use Controlled by: Clinical observations.

Some Commercial Preparations: Aspestrin, gonadotropic (maturity) factor.

TABLE VI.—OVARIES

Female sex hormones elaborated by interstitial tissue of the ovary and prepared synthetically

A. Ovarian Estrogens—non-crystalline mixtures principally from pregnancy urine and placenta

ESTRONE

Standardization and Unit: One I. U. is equivalent in activity to 0.1 microgram of a standard preparation of estrone as determined by the vaginal response of the castrate rodent (1 mg. estrone = 10,000 I. U.).

Action: Causes estrus in spayed animals; stimulates estrogenic function in gonadal deficiency and uterine dysfunction.

Indications for Use: Gonorrheal vaginitis, papilloma of larynx, atrophic rhinitis, masculinity, amenorrhea. There has been considerable clinical research with estrogenic substances, and many claims made have been somewhat exaggerated.

Clinical Use Controlled by: Should be used only under constant medical supervision and dosage should be kept at a minimum. Breast and pelvic organs should be examined before and at intervals during therapy; and such symptoms as swelling of breasts and labia, growth of pubic hair, uterine bleeding and abdominal pain should be closely watched for. In gonorrheal vaginitis, vaginal smears and cultures should also be followed.

Administration and Dosage: Methods of administration—oral, intramuscular, spray, inunction, or vaginal suppository. Amount used in children varies greatly: it is best to follow instructions supplied by manufacturer for each preparation. A few suggested dosages and routines are as follows:

Gonorrheal vaginitis: Intramuscular estrone, 2000 I. U. three times weekly until three smears become negative; duration of treatment varies considerably, but should be continued at least a month. — Vaginal suppository estrone (infant or juvenile size), 1000 to 2000 I. U. daily for 3 to 8 weeks or for one week after the smears have become negative. Often supplemented with intramuscular injections.

Papilloma of larynx: Local application of estrogenic hormone, about 1000 I. U. (0.1 cc. Amniotin in oil) applied weekly by means of a direct laryngoscope or by spraying the solution directly into the larynx. Treatment has been given for from 5 to 10 weeks.

Atrophic rhinitis: Spray Estriol (dissolved in olive oil, 100 mg. per cc.). Use nasal atomizer and spray about 0.25 cc. into each nostril 3 times daily. Cotton pledgets soaked with solution may be applied directly.

Menstrual disorders (abnormal vaginal bleeding)—Rarely used for this in pediatrics.

Some Commercial Preparations: Amniotin, Estrolin, Estromone, Folestrin, Menformon, estrogenic hormone.

ESTRIOL GLYCURONATE

Standardization and Unit: Oral daily unit = minimal amount which produces estrus in 3 to 5 days when given 19 to 21 day old immature rats for 3 days (Collip).

Action: Effective orally only.

Indications for Use: Same as for estrone.

Clinical Use Controlled by: Same as for estrone.

Administration and Dosage: Used orally only.

Some Commercial Preparations: Emmenin.

B. Ovarian Estrogens—natural crystalline compounds

1. ESTRONE (Theelin)
2. ESTRIOL (Theelol)
3. ALPHA-ESTRADIOL
4. ALPHA-ESTRADIOL BENZOATE ALPHA-ESTRADIOL DIPROPIONATE ALPHA-ESTRADIOL PROPIONATE

Standardization and Units: (1)* By weight in mg. per cc.; assayed same as non-crystalline mixtures. (2) About 1/50 to 1/100 as active as estradiol. (3) Assayed in Allen Doisy rat units; 2 rat units = 10 I. U. (4) Unit = 0.1 microgram of standard preparation. Estrone and esters of alpha-estradiol cannot be properly compared since their relative activity and period of action are not the same.

Action: All four, same as for estrone, except alpha-estradiol esters are more slowly absorbed. Alpha-estradiol is the most potent naturally occurring estrogen.

Indications for Use: All four, same as for estrone.

Clinical Use Controlled by: All four, same as for estrone.

Administration and Dosage: All four, same as for estrone.

Some Commercial Preparations: (1)* Estrone, Theelin, (2) Estriol, (3) Dimenformon, Estradiol, Ovocylin, Progynon, D.H., (4) Ben-ovocylin, Di-ovocylin, Dimenformon Benzoate, Progynon B.

C. Crystalline Synthetic Estrogens

DI-ETHYL STILBESTROL**

Standardization and Units: By weight in mg.

Action: Same as for natural estrogens.

Indications for Use: Whenever an estrogenic effect is desired, may relieve painful engorgement of breasts on weaning; gonorrheal vaginitis in children; masculinization in female.

Clinical Use Controlled by: Same as for natural estrogens.

Administration and Dosage: Available in tablets, in oil, in ampules and suppositories. Is usually well tolerated when used in girls with gonorrheal vaginitis—by mouth, 20 mg. total dosage given over period of 1 to 3 weeks; suppository, 0.1 mg. daily for minimum of 3 weeks.

Some Commercial Preparations: Stilbestrol.

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*These numbers refer to crystalline compounds 1 to 4 as numbered in heading.

**Hexestrol and triphenylchlorethylene also available but not widely used; action similar to di-ethyl stilbestrol.

TABLE VII.—CORPUS LUTEUM

Progestational hormone—elaborated in cells of corpus luteum and prepared synthetically

PROGESTIN
(natural)

Standardization and Units: One I. U. = the progestational activity of 1 mg. crystalline progesterone. One Allen-Corner rabbit unit = approximately 1 I. U.

Action: Induces hyperemia of female genitalia, stimulating their functional activity and increasing the ovarian estrus producing hormone.

Indications for Use: No pediatric applications known.

Some Commercial Preparations: Agomensin, Lipo-tulin, Progestin.

PROGESTERONE
(synthetic)

Standardization and Units: Same as for progestin.

Action: Same as for progestin.

Indications for Use: No pediatric applications known, other than possibly in older girls.

Administration and Dosage: Functional uterine bleeding—2 mg. daily last 8 to 10 days of cycle; dysmenorrhea—1 to 2 mg. before onset of menses. These are adult dosages.

Some Commercial Preparations: Lutocylin, Progesterone, Progestin, Progestone, Proluton.

ANHYDROHYDROXY PROGESTERONE
(ethinyl testosterone)

Standardization: By actual weight in mg.

Action: Same as for progestin.

Indications for Use: No pediatric applications known.

Some Commercial Preparations: Pranone, Progestoral.

TABLE VIII.—PLACENTA

The chorionic gonadotropic hormones—elaborated in placental tissue and also found in pregnancy urine and serum

CHORIONIC GONADOTROPIN
(from human placenta or pregnancy urine)

Standardization and Unit: One I. U. = specific gonadotropic activity of 0.1 mg. of standardized powder and is approximately equal to one rat unit.

Action: In the male, stimulates the immature testis, inducing secretion of the male sex hormones; effect primarily on the interstitial cells. In the female, stimulates activity of the ovary, producing little or no follicular growth; acts chiefly on thecal tissue.

Indications for Use: Dystrophia adiposogenitalis (Fröhlich's syndrome), usually supplemented with thyroid extract. For growth in patients with genital dystrophy, if under 13 years of age. In male, hypogonadism and cryptorchidism.

Clinical Use Controlled by: Clinical effects.

Administration and Dosage: For Fröhlich's syndrome, 1500 I. U. intramuscularly one to three times weekly, supplemented with thyroid extract. For cryptorchidism in child, 150 to 750 I. U. intramuscularly three times weekly, starting after the seventh year, preferably before puberty.

Some Commercial Preparations: A.P.L., Anterior pituitary-like hormones, Antuitrin-S, Entromone, Follutein, Korotrin, Pranturon, Pregnyl.

CHORIONIC GONADOTROPIN
(from pregnant mare's serum)

Standardization and Unit: One I. U. = 0.25 mg. of a standard powder.

Action: Produces ovarian follicle stimulation and ovulation, the absence of which is probably linked with incomplete ovarian cycles and certain menstrual disorders. Stimulates development of sperm in the male. Promotes general gonadal function.

Indications for Use: In male, hypogonadism, cryptorchidism; in female, amenorrhea, functional uterine bleeding, hypogonadism.

Clinical Use Controlled by: Clinical effects.

Administration and Dosage: Optimal effective dose has not been established. For cryptorchidism—50 to 100 I. U. three times weekly, intramuscularly for 2 or 3 months.

Some Commercial Preparations: Anteron, Gonadin, Gonadogen.

TABLE IX.—TESTES

Male sex hormones—elaborated by interstitial cells of testes but now prepared synthetically

METHYL TESTOSTERONE, TESTOSTERONE PROPIONATE, TESTOSTERONE

Standardization and Unit: By weight, formerly one I. U. equalled 0.1 mg. crystalline androsterone. One mg. testosterone = approximately 50 I. U. Androsterone has been synthesized, but is no longer available commercially since testosterone is more potent and less expensive.

Action: Stimulates development of male sex characteristics, serves as substitute for normal internal secretion of testes, inhibits gonadotropic action of the pituitary, inhibits lactation, suppresses menstruation.

Indications for Use: In male—hypogonadism, eunochoidism, cryptorchidism, gigantism (to reduce growth), gynecomastia. In female—functional uterine bleeding, dysmenorrhea. Is less desirable than the gonadotropic factor of pregnancy urine for treatment of cryptorchidism, as the latter does not cause injury to the testis or induce precocious puberty. Has been used in papilloma of the larynx and for inhibition of lactation in nursing mother.

Clinical Use Controlled by: Clinical effects—may cause distressing symptoms as dyspnea, palpitation and edema. In females, high dosage may produce transitory masculinization.

Administration and Dosage: Intramuscular injection and pellet implantation of testosterone propionate; methyl testosterone—orally; all three forms—inunction. Dosage for treatment of hypogonadism varies from 5 to 25 mg. three times weekly.

Some Commercial Preparations: Metandren, Neo-hombreol, Neo-hombreol (M), Oreton, Oreton (M), Perandren, Testosterone propionate.

Discussion

It has long been known that extracts of the thyroid, parathyroid, and pancreas are extremely valuable in the practice of pediatrics. Desiccated thyroid and thyroxin have been widely used in childhood, and the indications for their use have changed very little. Recently, however, it has been found that thyroid extract is a useful supplement to anterior pituitary therapy. Analysis of the blood for bound magnesium and serum phosphatase as well as the hormonal iodine content have become important in following the course of thyroid therapy. On the other hand, these newer methods have not as yet supplanted the more simple determination of the basal metabolic rate. In parathyroid deficiency, experience has taught us that better results are obtained by using substances having somewhat similar action to that of parathyroid extracts, namely, Dihydrotachysterol or Calciferol (vitamin D_2). This also applies to infantile tetany. Other than its use in the control of diabetes mellitus in children, insulin has been employed to some extent in the treatment of malnutrition. It is interesting to note that the value of extracts of certain glands (adrenals and piuitary) are well known, and it may even be said that the practice of pediatrics today would be difficult without the extract of the adrenal medulla. On the other hand, many new discoveries have been made, so that these glands have assumed even greater significance both physiologically and in medical practice.

Even Addison's disease may occur in infancy, thereby indicating the usefulness of the adrenal cortical hormone in the pediatric age group. It is well known that this hormone exerts its effects on many of the tissues of the body, yet the exact mechanism is not completely understood. There is no doubt that when the physiologic reactions of the adrenal cortex and the similarly acting synthetic preparations are better understood, more indications for their use in childhood undoubtedly will develop. Several crystalline steroids have been prepared from the adrenal cortex which induce some of the effects of the natural extracts when administered, but since these substances are not the hormone, it is improbable that the gland produces all of these effects. Of the various crystalline steroids, desoxycorticosterone acetate has received the most attention. Since it is readily available and much less expensive than the natural extracts, it has found a wide clinical application with reports of a satisfactory nature in the treatment of Addison's disease. Although it has been used in many other conditions, such as surgical shock, asthma, acute infections and myasthenia gravis, the results obtained appear to be equivocal. It is a desirable substitute for the adrenal cortical hormone when carefully controlled by blood electrolyte determinations, but there is danger of serious results if too much is administered; whereas larger doses of the cortical extract itself cause no untoward effects.

At present the clinical applications of the anterior pituitary extracts are considered to be in the experimental stage and the usefulness of these extracts must await the preparation of better products before proper evaluation of their relative merits can be made. The use of pitressin in cases of diabetes insipidus and as a diagnostic test for epilepsy has become well established; however, solution of the posterior pituitary can be used for these purposes. Pitocin, the oxytocic factor of the posterior pituitary gland, has no special indication in pediatrics. As regards the extracts of the anterior pituitary, some preparations are available commercially, but in most instances reports of their effects are contradictory. In many cases only positive results are reported so that no evaluation of the percentage of efficiency can be obtained. The apparent failure of most of the extracts may be due to the difficulty of preparing highly purified and potent compounds containing only one representative factor. Although it was expected that gonadotropic substances of the pituitary might be useful in medicine, this has not proven true. In those instances where stimulation of the gonads is desired, the chorionic gonadotropins have been found to be more efficient. The gonadotropins vary somewhat in their action; the chorionic gonadotropin from pregnancy urine has little, if any, effect on the ovary if the pituitary is intact and none at all if it has been removed or is non-functioning, while the anterior pituitary gonadotropins stimulate the ovary even in the absence of the pituitary gland. The hormone from pregnant mare's serum acts like the pituitary hormone. These three available gonadotropins are of little value in stimulating the ovary but have proved more useful in the treatment of cryptorchidism.

Among the hormonal preparations which are new to the practice of medicine in children are those of the sex hormones. The use of these substances is still in the experimental stage and at present their expense limits the possibility of a wider application in clinical pediatrics. In the matter of treatment of cryptorchidism, considerable variation in procedure exists. One plan which now seems quite worth while is to attempt administration of the chorionic gonadotropic hormone, using the dosage recommended by the manufacturer. It is advisable not to start before the child is 7 years of age, yet the treatment should be initiated before the age of puberty. If no results are obtained it probably is worth while to combine this treatment with testosterone. If there is no response to this combined treatment, orchopexy is recommended, usually at the age of from 8 to 10 years.

The most useful function therapeutically of the estrogenic substances seems to be in gonorrheal vaginitis. More recently the sulfonamide drugs have been used alone or with estrogens. Results obtained with sulfathiazole seem to be most satisfactory. Occasionally menstrual disorders in the growing child are encountered which may indicate estrogenic therapy. An indirect relationship to pediatrics is the use of estrogenic substances to suppress engorgement of the breasts in the mother if it becomes necessary to wean the infant. Application of the estrogens may be valuable in correcting the disagreeable condition of atrophic rhinitis, which is found occasionally in children. It is of especial interest that these same hormones have been helpful in the control of one of the most unsatisfactorily treated conditions in children, namely, papilloma of the larynx.

To date, pediatric applications of extracts of the corpus luteum (progestational hormone) do not exist. Since it is not definitely known just how the thymus and pineal glands function in the body, their clinical significance must await further chemical and biological research.

Medical Management of Megacolon*

Robert H. Alway, M.D.
Minneapolis, Minnesota

SINCE 1886, when Hirschsprung brought general attention to the problem of idiopathic dilatation of the colon, many causes for this condition have been advanced. At present it is considered a result of imbalance of the autonomic nervous system. In the past decade the neurogenic theory has gained general acceptance. It is supported less by histopathologic evidence than by the successful therapeutic methods which are in large part based on alteration of the autonomic control of the colon and rectum. Megacolon is primarily a disease of infancy and childhood. At least 70 per cent of the cases appear within the first few weeks of life. In the past 14 years, 12 patients with megacolon have been admitted to the Pediatric Service of the University of Minnesota Hospital, eight of whom have been treated in the past five years. Two of the four patients treated prior to 1938 appeared to be secondary to an anatomical obstruction. The other two died, the only deaths among the 12 cases. One of these, an infant aged 23 months, died suddenly four months following his discharge from the hospital, but the cause of death was not determined. The other patient was admitted to the hospital in extremus and died of a generalized peritonitis secondary to a volvulus and gangrene of the sigmoid. He was first seen at the age of 5 years and at that time a lumbar sympathectomy was proposed, but he failed to return to the hospital as had been requested. Our experience with the remaining eight cases will be referred to in the discussion of the management of megacolon.

ETIOLOGY

The etiology of primary megacolon is not known. Of all the theories advanced, none is applicable to all cases. It is possible that an interrelation of two or more factors may exist, and that the cause may be different in some instances. Since any rational therapeutic approach is dependent on an understanding of the possible etiologic factors involved, some basic data will be discussed briefly.

Innervation of the Colon and Rectum

The craniosacral (parasympathetic) division of the general visceral efferent system furnishes the motor supply to the colon and rectum. The motor fibers sup-

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*From the department of pediatrics, University of Minnesota.

plying the proximal portion of the colon, including the first third or half of the transverse colon, are supplied by the vagus nerve. The pelvic nerves (nervi erigentes), arising from the second to fourth sacral segments, supply the distal portion of the colon and rectum. The thoracicolumbar (sympathetic) division of the general visceral efferent system supplies inhibitory fibers to the entire colon. The sympathetic (inhibitory) fibers to the cecum, ascending, and transverse colon proceed by way of the inferior mesenteric plexus; while those of the descending colon, sigmoid, and rectum arise from the second and third lumbar segments and go by way of the lumbar splanchnics to the inferior mesenteric and hypogastric ganglia, reaching the latter by the pre-sacral (hypogastric) nerve. Supplying the descending colon and sigmoid are the lumbocolonic nerves which are post-ganglionic fibers of the inferior mesenteric ganglion. The rectum is supplied by the pelvic (inferior hypogastric) plexus arising from the hypogastric ganglion. The inhibitory fibers to the internal anal sphincter, however, are parasympathetic while the motor fibers are sympathetic.

Experimental Work on the Autonomic Control of the Colon

Adamson in 1932 found that following section of the parasympathetic supply to the colon and bladder by division and avulsion of the roots of the pelvic nerve, urinary retention immediately developed. Roentgenographic evidence of megacolon developed in those animals surviving eight weeks. He felt that the association of a dilated bladder, which occurred experimentally, and on occasion clinically with megacolon and which improved after presacral sympathectomy, was an indisputable argument in favor of the neurogenic theory of primary megacolon. The nerve supply is the only factor which the bladder has in common with the rectum and colon. Morton and Scott in 1930 showed that removal of the inferior mesenteric ganglia or of both lumbar sympathetic chains in cats produced increased peristalsis and increased tonus of the bowel wall. Section of one or more lumbocolonic nerves caused increased motor activity only in the segments supplied by the sectioned nerves. Results identical with those of sectioning were obtained in all cases following spinal anesthesia, and he believed that this was due to temporary interruption of the inhibitory action of the sympathetics. Langley and Anderson in 1895 first demonstrated that stimulation of the lumbar sympathetics produced dilatation of the colon and contraction of the internal anal sphincter, thus preventing defecation. Learmonth showed that section of the lumbar sympathetics in animals resulted in increased bowel activity.

Physiology of Colon Activity

Sympathetic (adrenergic) activity causes an increase in the diameter of the colon, relaxing its wall and contracting the internal anal sphincter, while the opposite results from parasympathetic (cholinergic) activity. It may be assumed, therefore, that a relative sympathetic overactivity permits filling of the bowel, while a relative parasympathetic overactivity permits emptying of the bowel. In health there is physiologic balance. If emptying does not follow the setting up of the defecatory reflex, which is initiated by stretching of the bowel wall coincident with filling, the colon will adapt itself to its contents. When this occurs there is no further stimulus to defecation until the bowel wall is again stretched. If any cause prevents emptying of the rectum then, through successive readaptations, the capacity of the rectum and, even more, that of the distal colon will become greater. Rectocolonic dysfunction may follow, then, from adrenergic dysfunction coincident with relatively opposite variation in cholinergic function. The various possible combinations of sympathetic-parasympathetic imbalance must be kept in mind in approaching the problem of primary megacolon.

Autonomic Pharmacology in Relation to Megacolon

The activity of any organ is the result of the action of the adrenergic and cholinergic factors of the sympathetic and parasympathetic nerves. Acetylcholine is produced at the neuromuscular junction of the parasympathetic (cholinergic) nerves and also in lesser amounts at the synapse between the pre-ganglionic and the post-ganglionic fibers of the sympathetic (adrenergic) nerves. Acetyl-beta-methyl choline has an action similar, though not corresponding exactly, to that of acetylcholine, and it is more stable. The effective dose varies from person to person. This drug, which is known commercially as Mecholyl, is available as the chloride or bromide salt. The former is hygroscopic and deteriorates rapidly unless in solution, while the latter is more stable and appears clinically to be less toxic. Mecholyl bromide has the added advantage of being effective when given by mouth. The pharmacologic action of prostigmine is synergistic to acetylcholine and Mecholyl: it enormously enhances their action and acts either by stabilizing them or by inhibiting choline esterase. When given orally with or before Mecholyl, prostigmine produces intestinal motility far greater than does Mecholyl alone. Atropine is antagonistic to the cholinergic drugs, stopping or preventing the action of acetylcholine, Mecholyl, and prostigmine. Its site of action is probably in or near the reacting cell. In case of severe reaction to Mecholyl, the use of atropine in a dose of 0.2 to 0.3 mg. (gr. 1/300 to 1/200) hypodermically will promptly block the action of Mecholyl. When prostigmine has been given with Mecholyl, it is advisable to give epinephrine in addition. Syntropan is the phosphate salt of 3-diethylamino 2, 2 dimethyl, propanol tropic acid ester and acts similarly to atropine but is less toxic. It does not have atropine's undesirable side effects, and it controls intestinal tonus without interfering with the peristaltic reflex.

PATHOLOGY

In megacolon the affected portion of the colon shows a characteristic tremendous dilatation and hypertrophy of the muscularis, although occasionally the colon wall is thin and translucent with the haustral markings lost. The lymphatics and mesenteric glands are enlarged. Ulceration of the mucosa sometimes occurs; this may proceed to perforation. The mesenteric thickening is sharply limited to the involved section of the colon.

The process usually begins in the sigmoid and may progress in a retrograde direction until the entire colon is involved. The sigmoid alone is involved in about 50 per cent of the cases, while involvement of the entire colon is next in frequency. The small intestine and rectum are usually normal, though the latter may share in the process.

Microscopically there is an increase in the cellular elements of the mucosa and muscularis and an increase in the blood vessels of the mucosa. The serosal changes are minimal. The hypertrophy of the wall is mainly through increases in the circular muscle layer.

Diagnosis

The diagnosis of megacolon usually presents little difficulty, but an attempt should be made to determine the etiologic factors present. The patient with primary megacolon will give a typical history and present characteristic physical findings and roentgenographic changes. Obstinate constipation, not responding to laxatives or purgatives, and abdominal distension dating from birth or early infancy strongly suggests the diagnosis. The picture is striking in that usually the appetite and digestion are good, the nutrition little impaired, and the child appears in good health. Megacolon is remarkable for the extraordinary infrequency of bowel movements without signs of acute intestinal obstruction. In about one-third of the cases there is a history of one or more episodes of vomiting or attacks of diarrhea. If these occur frequently the child is more apt to appear dull and apathetic and present cardio-respiratory symptoms through displacement of the thoracic viscera by the tremendously dilated colon. Children with chronic abdominal enlargement not due to megacolon are not infrequently misdiagnosed. A large dilated atonic colon may also be seen in severe nutritional disorders, particularly in thiamin deficiency and in celiac disease, as well as in hypothyroidism. Rickets, tuberculous peritonitis, the celiac syndrome, hypothyroidism, and chronic intestinal obstruction may be initially confusing because of chronic abdominal enlargement, but, except as noted above, these do not have a greatly dilated colon.

In establishing the diagnosis of primary megacolon, a fairly simple routine may be followed. In securing the history, particular note is made of the time of onset, occurrence, and frequency of any spontaneous bowel movements or attacks of vomiting or diarrhea, the frequency of any enemata which may be necessary and the response to any previous treatment. After a complete general physical examination, not forgetting digital examination of the rectum, a sigmoidoscopic inspection is made in search of any distal colonic abnormality. Findings suggesting an anatomic obstruction should be checked before surgical intervention. A flat film of the abdomen secured previous to barium studies will frequently show marked gaseous distension of the colon. The picture obtained using the barium enema will give some idea as to the severity of the megacolon, not only as to size and extent, but also as to the presence of efficient peristaltic activity.

Suggestions for Management

In many instances the child with congenital megacolon has never had a spontaneous bowel movement, having never experienced a normal defecatory impulse. Conditioning the child to have normal evacuations is the desired end result of treatment. The present therapeutic approach has as its basis the correction of a possible alteration of the autonomic control of the colon and rectum. This may be accomplished through the use of drugs acting on the autonomic nervous system or by sympathectomy. A detailed discussion of the surgical management of megacolon is beyond the scope of this report; however, the mortality is reported to be considerably lower with surgical treatment than in those cases treated medically. Cahill states "surgical treatment offers the best chance for cure, estimates varying from 32 to 90 per cent, as compared with 1.5 to 25 per cent with medical treatment." None the less, from our experience, as well as that of others, we believe that a painstaking attempt at medical correction should be made before surgical intervention. Children under 3 years of age do not appear to benefit as much from or withstand sympathectomy as well as do older children. There is no reliable preoperative test with which to prognosticate the results of sympathectomy. Many cases do well on Mecholyl or Syntropan. It is stated that those children showing thinning of the colon wall and loss of colonic muscular power will not benefit from sympathectomy. Such cases can usually be recognized in the course of the medical management. The presence of actual obstruction or the failure of medical management are the recognized indications for surgical intervention.

Physiologists have long known that stimulation of the lumbar sympathetic ganglia caused inhibition of the colonic peristalsis, dilatation of the colon, and contraction of the internal anal sphincter. This concept was not applied to primary megacolon, however, until after Royle and Hunter, in 1924, noted relief from constipation in a series of patients with spastic diplegia on whom they had performed a left lumbar sympathectomy. Subsequent to this Wade and Royle successfully applied this procedure to Hirschsprung's disease. Since that time several modifications and improvements of the original procedure have been advanced.

An occasional case of megacolon will be acutely distended when admitted to the hospital and will require active and rapid efforts toward deflation and evacuation. Simple enemata are usually not sufficient. It has been our experience that the most satisfactory procedure in this situation is as follows: a large rectal tube with a Y-tube at one end is inserted well into the rectum. The open ends of the Y-tube are connected with a quart irrigating can and a Mueller suction machine. Then water at a temperature of 102 to 104 F. is allowed to run in and then aspirated. In this way almost all accumulations of fecal matter can be removed. Rarely is it necessary to remove impacted feces bit by bit through a proctoscope. After the initial active cleansing is accomplished the child is placed on a nutritious diet, supplemented with iron and such additional vitamins as are indicated. Mineral oil is given in a dose of 1 to 2 oz. every evening. The child is placed on the toilet after every meal and urged to "grunt" with a view to a sustained contraction of the abdominal muscles. In addition, a high "hot" (110 to 115 F.) enema (special studies on this procedure made by Dr. Aaron Friedell are reported elsewhere) is given every morning after breakfast just before the child is placed on the toilet. Fairly adequate evacuations are usually obtained on this regimen alone within a few weeks time. The size of the enema is then gradually decreased from the original volume of about 1000 cc. down to 100 - 150 cc. Some patients will continue to have satisfactory evacuations without further distension or unusual accumulation of feces on this relatively simple routine.

The effect of training in developing a reflex for defecation is demonstrated in the following case history of a 2 year old boy in whom it was not possible to maintain bowel deflation with small enemata. It was suggested by the Psychiatric Clinic for Children that an attempt be made to develop a conditioned reflex. This was undertaken by Dr. R. E. Harris using the following routine: every morning the child was given an enema and taught to expel it by contracting his abdominal muscles. Sustained abdominal contractions, successful or not, were applauded and extravagantly praised. If he did not do as he was told, a slight galvanic shock was given above the iliac crest. Actually the shock was necessary on only two or three occasions at the beginning of the three week training period. By that time merely placing the child on the toilet after injecting a small enema resulted in a voluntary effort and a satisfactory bowel movement. Following this, he was discharged and got along well, requiring an enema only once or twice a month. This case demonstrates the importance of training in the management of megacolon.

Spinal anesthesia has been advocated as a form of therapy in megacolon as well as a preoperative aid for prognosis of the probable results to be obtained by sympathectomy. Success is apparently dependent on removing the effect of the sympathetic nervous system on the colon, but it is not certain that the parasympathetic control is not also abolished. Five of our eight cases were given spinal anesthesia. While one showed an increase in peristalsis, observed fluoroscopically following a barium enema,but no evacuation followed. In the remaining two cases a very active peristalsis and forceful evacuation resulted. Cutaneous anesthesia in these five cases extended up to about the nipple level. None of the five cases showed any continuation of effect or other subsequent response to the anesthesia, contrary to the observation of some workers. There was no apparent relation between the response to spinal anesthesia and to Mecholyl or Syntropan.

Seven of the eight cases followed have ben treated with Mecholyl as advocated by Law. The results in five cases have been satisfactory. Two patients have not been on Mecholyl sufficiently long to be certain of their eventual course. In all the cases Mecholyl was started with a dose of 50 to 100 mg. one-half hour after breakfast, and the dosage increased 50 to 100 mg. at a time at three to four-day intervals until bowel movements resulted or toxic signs appeared. Toxic reactions occurred more frequently when the drug was given before breakfast. The signs of toxicity are: nausea, vomiting, hyperperistalsis, diarrhea, pallor, cold perspiration, cyanosis and bradycardia. It is especially worthwhile to note that toxic reactions with Mecholyl can be relieved promptly by atropine sulfate, 0.2 to 0.3 mg., given hypodermically. A mid-afternoon dose of 50 to 100 gm. was added after a week to ten days, if necessary. Concurrent administration of mineral oil, morning enemata, and efforts at evacuation by the child were also used.

Klingman has proposed a classification of megacolon based on the response to autonomic drugs and the characteristics of emptying of the colon and sigmoid as followed fluoroscopically after a barium enema. If the rectosigmoid apparatus is not functioning, that is, the rectosigmoid empties poorly, while the rest of the colon appears normal, he advises the use of Syntropan or benzedrine. He uses the term rectosigmoid achalasia for this condition and states that it is due either to parasympathetic underactivity or sympathetic overactivity, the former responding to Syntropan. The latter responds to no drugs and for this condition he recommends sympathectomy. Those cases which show good rectosigmoid function, as shown by adequate emptying while the remainder of the colon does not, should respond to Mecholyl and/or prostigmine.

The first patient on whom we used Syntropan was a 9 year old girl with a typical history of constipation and abdominal distension since birth. Barium enema and proctoscopic examination showed what appeared to be a stricture about 14 cm. above the pectinate line, and because of this, surgical intervention was planned. The barium enema and proctoscopy were repeated, however, and this time no stricture was found. Syntropan has been tried on three other patients without effect.

SUMMARY

Medical management of the cases observed recently at the University of Minnesota Hospital appears to offer success in properly selected cases. The employment of several therapeutic procedures simultaneously offers the greatest success. The use of local procedures for conditioning the colon to develop a reflex contraction response, associated with the use of drugs designed to overcome the possible local or general autonomic imbalance, appears to yield the best results. In properly selected cases diligent medical management should be tried before resorting to surgery.

REFERENCES

Bartle, H. J.: Am. J. Med. Sc. 171:67, 1926.
Scott, W. J. M., and Morton, J. J.: J. Clin. Investig. 9:247, 1930.
Adamson, W. A. D.: Br. J. Surg. 20:220, 1932.
Telford, E. D.: Br. Med. J. 2:1224, 1939.
Myerson, H.: J.A.M.A. 110:102, 1938.
Law, J. L.: Am. J. Dis. Child. 60:262, 1940.
Klingman, W. O.: J. Pediat. 13:805, 1938.
Judd, E. S., and Thompson, H. L.: Minn. Med. 61:439, 1928.
Rankin, F. W., and Learmonth, J. R.: Am. J. Surg. 15:219, 1939.
DeTakats, G.: J. Pediat. 13:819, 1938.
Cahill, J. A., Jr.: Christopher's Textbook of Surgery; second edition; Philadelphia, Saunders, 1939.

Congenital Hemolytic Jaundice with Hemolytic Crises in Children*

Emanuel S. Lippman, M.D.
Minneapolis, Minnesota

CONGENITAL hemolytic jaundice has been known to the medical profession for over one-half a century. First described in 1885 as a symptom complex by Murchison, in 1898 it was established as a clinical entity. Its familial occurrence was first emphasized by Mankowsky in 1900. However, it has been only during the past ten years that the literature has revealed its existence in infancy.

The diagnosis of a typical case of hemolytic jaundice depends upon the following findings: (1) Jaundice. (2) Anemia, always one of the most striking symptoms of the disease. (3) Occasional appearance of hemolytic crises varying in severity, associated with fever, marked increase in anemia and in jaundice. (4) Splenomegaly. (5) Occasionally enlarged liver. (6) Increased bilirubin in the blood. (7) Positive indirect Vandenbergh reaction and at times a positive direct. (8) Stools may be deeply colored. (9) Abnormal blood findings which include increased fragility, increased reticulocyte count as well as other evidences of regeneration, microcytosis, and particularly the presence of the microspherocytes.

Two cases recently observed add some interesting information which is of value in confirming the latest forms of treatment.

Case Reports

Case 1. A 13 month old Italian girl was admitted to Minneapolis General Hospital on May 11, 1940, with the following history. On May 7, 1940, the mother first noticed that the child looked yellow, had no appetite, and was very irritable.

There was no history of any previous similar symptoms. The past history of both the family and the child were entirely negative. The child was well developed and well nourished. Her skin was a lemon yellow with a faint icteric tint to the outer margin of the sclera. She appeared very pale, her features mongoloid. Chest, heart, and lungs were negative. The tip of the spleen could be felt with difficulty. There was no lymphadenopathy. A mild upper respiratory infection had obtained.

On admission the hemoglobin was 15 per cent, red blood cells 950,000, white blood cells 35,000, with 31 per cent mature polymorphonuclear neutrophiles, 51 mature lymphs, 2 myelocytes, 6 monocytes, 1 leucoblast, 2 promyelocytes and 6 per cent metamyelocytes. The reticulocyte count was 34 per cent, platelet count 500,000, bleeding and coagulation time 5 minutes and 2 minutes 55 seconds respectively. There were 19 normoblasts per 100 white blood cells. The fragility test in the control showed hemolysis beginning at 0.46 per cent NaCl, and completed at 0.32 per cent. In the patient hemolysis began at 0.54 per cent and was completed at 0.38 per cent. Prothrombin time was 17½ seconds. The patient was given 200 cc. of whole blood intravenously on the day of admission and on the following day the hemoglobin was 37 per cent with red blood cells 2,040,000. The hemoglobin dropped slowly and six days later it was 31 per cent with red blood cells of 1,053,000. The blood morphology studies by Dr. Hal Downey on May 20 confirmed the diagnosis of congenital hemolytic jaundice with probably some infection.

It was the consensus of the attending staff that the child was in an active hemolytic crisis and that the best course to follow was that advised by Amberg,[1] namely, repeated transfusions to keep up the general condition until the crisis had passed, at which time the splenectomy would be done. But under this procedure the child's condition did not improve. Instead, she seemed to benefit less from each successive transfusion. The hemoglobin dropped more rapidly as time went on and the child began to look much worse during each interval of three to five days between transfusions. The normoblasts varied from 10 to 24 per 100 white blood cells; the reticulocyte count 25 per cent to 35 per cent. The child had a septic temperature up to 102° F. daily, excepting an occasional period of two to four days when the temperature remained normal. The studies of the chest, urine, and X-ray of bones, as well as the daily blood studies, revealed no evidence of active infection. This situation continued for one month when it became evident that unless splenectomy were done, the patient was moribund. At this stage her hemoglobin dropped in two days from 37 per cent to 13 per cent.

On June 10th, after she had been given a transfusion of 300 cc. of whole blood, splenectomy was done. Just before the operation the hemoglobin was 60 per cent. Two hours later it was 72 per cent, that evening it was 64 per cent. The child had an uneventful postoperative course and seemed to be getting along well until four days later, when the hemoglobin dropped to 49 per cent, next day to 44 per cent, and the next to 32 per cent. The child was then given 250 cc. of whole blood intravenously and the hemoglobin again rose to 54 per cent. It is interesting to note here that the normoblasts suddenly rose from 19 to 117 per 100 white blood cells and remained very high until the end. The temperature began to rise on June 15, and rose to between 103° and 104° every day thereafter. The course continued with little change. Child appeared slightly better following transfusions when there would be a temporary rise in hemoglobin, only to drop the next day. Neither sulfanilamide nor sulfathiazole seemed to influence the course of the disease. Apparently the fever was not due to infection but rather to the extreme hemolysis.

Death occurred 1 July, 1940, 20 days after splenectomy and after a seven weeks' stay in the hospital. The pathologic examination of the spleen showed the characteristic picture of congenital hemolytic jaundice. The autopsy findings revealed a clean splenic bed, no evidence of any accessory splenic tissue, and no evidence of postoperative hemorrhage. The abdominal wound was well healed with no evidence of local or generalized infection. There was a mild acute interstitial pneumonia, with passive congestion of the liver. Upon exposing the ribs in their bed, a very marked increase over normal in the amount of red bone marrow was seen. The bone cortex which was black was found in every rib exposed. The bone marrow showing a very marked hyperplasia extended to the cartilaginous portions of the rib adjacent to the sternum on each side. The small amount of pneumonia was not sufficient to cause death. Death was apparently due to complete exhaustion of the hematopoetic system.

Case 2. A 20 day old girl with hemoglobin of 35 per cent was seen in April 1941. This infant had presented symptoms of erythroblastosis fœtalis immediately after birth, but had received several blood transfusions as well as liver extract subcutaneously and had improved sufficiently to go home at the age of ten days with hemoglobin of 60 per cent. She did well until her 20th day, when she became very pale and listless.

The child was admitted to a private hospital where the hematological report indicated a probable diagnosis of erythroblastosis fœtalis. During the next six days, the baby received transfusions either daily or every other day, as well as liver extract subcutaneously. Vitamin K was given daily. The hemoglobin rose immediately following transfusions but dropped again by 15 per cent to 20 per cent daily. After the third day, the rectal temperature rose to between 102° and 103° and remained elevated. There was a progressive enlargement of the spleen, and the infant appeared very sick.

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*From the department of pediatrics, Minneapolis General Hospital, and the University of Minnesota.

The rapidly dropping hemoglobin, the high temperature for which there was no other obvious explanation, and the large spleen were due apparently to an active hemolytic crisis. Immediate removal of the spleen was advised.

Splenectomy was done on the 28th day of life. The infant's rectal temperature which was 104° at time of operation dropped to normal within twelve hours and remained down. The preoperative hemoglobin was 58 per cent, and was 68 per cent twenty-four hours later. It remained near the higher level thereafter. At present, nine months after the operation, her hemoglobin is 82 per cent and the child seems to have made a very uneventful recovery.

Pathologic report on the spleen was acute Lederer's anemia. The picture here was of a severe hemolytic crisis simulating the crisis of acholuric jaundice, a factor mentioned by Parsons.[2]

Comment

Diagnosis of congenital hemolytic jaundice is at times difficult since the classical symptoms are not always present. According to Gansslen,[3] 30 per cent of the patients do not have enlarged spleens. Fragility is normal in only 10 per cent of the cases according to Gansslen,[3] Sharp,[4] and others. Neither microcytosis nor spherocytosis need be present to confirm the diagnosis according to Abt.[5] Even macrocytosis may occur. Abt explains this fact emphasizing that macrocytosis is more or less physiologic in the young infant. Thompson[6] states that in all cases of typical hemolytic jaundice, the blood contains the spherical microcytes which he believes are as pathognomonic of hemolytic jaundice as are sickle cells in sickle cell anemia.

In the differential diagnosis of this disease, the view of Parsons[2] is of particular value. Comparing acholuric jaundice, sickle cell anemia, Cooley's anemia, and the acute hemolytic anemia of Lederer's type, he believes that the varieties of hemolytic anemias owe their clinical characters to permutations and combinations of the erythronic response to an injury, and that there are certain gradations of the same change in each one.

No doubt the diagnosis is at times somewhat difficult because of the atypical nature of the disease, the marked variability in the age of onset, the degree of severity, and the marked differences in symptomatology between the latent stage and the active crisis. However, once the diagnosis is established, it is again a difficult problem to decide the course to follow, particularly in the very mild, so-called benign cases, and at the other extreme the very severe cases where we have active hemolytic crisis.

We know that some individuals go through life with this disease, never presenting any symptoms other than a mild jaundice. It is certainly difficult for the physician to convince himself or his patient that a splenectomy should be done since the patient has suffered no severe symptoms and there seems to be a prospect that he will go through life without serious trouble. Many authorities believe that splenectomy should not be advised unless the symptoms are so severe as to cause definite incapacity. They justify this view by the fact that many patients never have their normal functions disturbed.

In a discussion of failed splenectomy by Watson and Young[7], they emphasize that failure of varying degree has been due to operative mortality, complications such as hepatic disease, and inability to achieve temporary or permanent relief from excess of hemolysis in spite of splenectomy. Also, according to Freund,[8] splenectomy does not guarantee freedom from the hemolysis. He cites a case of a 10 year old boy with a negative family history who had been markedly jaundiced for five weeks. With his hemoglobin at 42 per cent, the child was apparently in a mild crisis. He was transfused and sent home to get in better condition for surgery. He returned four months later, still jaundiced, hemoglobin 40 per cent, reticulocytes 27 per cent. The spleen was removed, and the postoperative course seemed good. However, the child had progressive severe anemia and subsequently died. The autopsy gave no clue why this case was any different from others in which the splenectomy was successful. In my opinion the prolonged crisis in this case had a very detrimental effect on the erythropoetic system.

The problem of splenectomy is further complicated by the controversy whether splenectomy should be done during crisis. Pemberthy and Cooley[9] feel that it is unwise to operate during hemolytic crisis, although they would rather risk operation than undergo a long severe crisis. However they have done splenectomies upon two newborn infants with erythroblastosis fœtalis, with good results.

In 1935 Bazin[10] emphasized that a diagnosis of pneumonia or influenza may be made instead of the true diagnosis of congenital hemolytic jaundice with fatal crisis of hemolysis. He stated further that it is wiser not to attempt a splenectomy during such a crisis, but to combat the progressive hemolysis and anemia with repeated transfusions, deferring the splenectomy until after the crisis has passed.

On the affirmative side of the question, Cowen[11] states that it is generally agreed that the administration of liver or iron and the use of X-rays or radium have little or no effect on acholuric crises. He strongly urges a splenectomy, believing that the operation brings complete and lasting recovery. The occasional occurrence of severe and sometimes fatal hemolytic crises coming unexpectedly, and the greater difficulty and danger of the operation in older patients supports the view that splenectomy should never be long delayed once the diagnosis has been made.

As far back as 1931, Dawson[12] advised the early operation for congenital hemolytic jaundice. He felt the failure of the operation was due either to insufficient removal of the spleen or to the bone marrow function failing to regain its full powers. He stated that the dominent lesion here is hemolysis which is met early by an overactive marrow. When the stage of exhaustion appears, the marrow becomes more normoblastic and eventually megaloblastic, as in pernicious anemia where the marrow is in an exhausted state from the onset of the disease. There is a cellular hyperplasia without functional efficiency, the ultimate result being an aplastic marrow and subsequent death.

Doan[13] cites seven cases of congenital hemolytic jaundice who were operated upon during active crises. Their ages varied from 4 to 56 years. Despite intensive liver therapy and repeated blood transfusions, they had failed to encourage remission. The anemia with its attendant manifestations became so severe as to threaten imminent death. Doan believes that in these cases, splenectomy is an emergency life-saving measure. All seven of these patients in acute crises were subjected to operation at a time when the red cells were at about 1,000,000, and all had a spectacular clinical response on the operation table, and each returned promptly to a normal hematopoetic balance. Doan further concluded that neither the crisis, the severity of the anemia, nor the obviously critical condition of the patient should contraindicate operative intervention. The seriousness of the surgical risk is not to be mentioned in terms of the usual criteria. The autotransfusion which occurs coincident with the operative manipulation, the immediacy of the reversal in the hemolytic mechanism, as well as the essential integrity of the bone marrow, are vital factors to the patient.

Diamond[14] cites a case of a 6 months old boy who began to show marked pallor at 4½ months. The day before he was brought into the hospital, his color became very poor; he was lethargic, had symptoms of cardiac decompensation, and died before he could be transfused. While this case is an extreme example of the rapidity and severity of acholuric crises, it illustrates the small margin of safety which occurs in hemolytic crises of congenital hemolytic icterus in infancy. On the other hand, Diamond reports another infant brought in at 4½ months of age with anemia of two months duration, a large heart with a loud murmur, large spleen, enlarged liver, and a hemoglobin of 24 per cent. The patient had very little fever but the rest of the picture was typical of hemolytic jaundice. This patient received two transfusions. Splenectomy was done immediately, and was followed by an uneventful postoperative course and convalescence. Diamond also cites a case of a 4½ year old boy under observation with recurrent jaundice, pallor, and fever. Splenectomy was advised but parents refused. Recurrence of crises continued. The course was typical of this disease. The attacks became more severe and frequent as time went on, more severe anemia developed, and finally cardiac decompensation, with death one year later.

Since 1935 numerous writers have emphasized that a hemolytic crisis is a severe emergency and that the patients should be operated upon immediately. Most of these authors agree that the patient should receive one or two transfusions preoperatively to help him stand the shock of the surgery. Sharp and Davis[15] feel that repeated transfusions during a crisis is dangerous. They cite Doan[16] and his associates who state that the addition of transfused blood cells only furnishes more material for hemolysis with consequent further pigmentary and toxic embarrassment of the liver and kidneys. They add that the patient in a crisis has his hematopoetic equilibrium already disturbed by the hemolytic process, and that the destructive function of the spleen is further intensified by the transfusion.

In retrospective consideration of the two cases discussed, it seems reasonable to believe that the high normoblast count during the last two weeks fits in very well with Dawson's[12] description of exhausted bone marrow. Very probably if the child in case 1 had been operated upon soon after admission instead of having been allowed to continue in the extremely severe crisis, there might have been a different result. Fortunately, in the handling of the second case, the splenectomy was done early, and the patient made an uneventful recovery.

SUMMARY

1. Congenital hemolytic jaundice with crisis has not been reported very often in infants and small children, but will probably be found more often when looked for.

2. In the diagnosis it is important to remember (a) 30 per cent may not have enlarged spleen; (b) 10 per cent have normal fragility; (c) diagnosis depends upon finding definite evidence of increased fragility of erythrocytes as well as the presence of microspherocytes.

3. Repeated transfusions during crisis should be avoided.

4. Small infants tolerate splenectomy well.

5. The crisis in this condition may be an extreme emergency, and the postponement of splenectomy may result in a fatal outcome.

BIBLIOGRAPHY

1. Amberg, S.: Brenneman, Practice of Pediatrics, ed. 3; Hagerstown, Md., W. F. Prior; v. 3, pp. 11, 23.
2. Parsons, L. G.: Lancet 2:1395, 1938.
3. Gansslen, M.: Deut. Arch. for Klin. Med. 146:1, 1925.
4. Sharp, J. C.: Internat. Clinics 2:146, 1937.
5. Abt, A.: Am. J. Dis. Child. 60:812, 1940.
6. Thompson, W. P.: J.A.M.A. 107:1776, 1936.
7. Watson, W. N., and Young, C. J.: Br. Med. J. 1:1305, 1938.
8. Freund, M.: Am. J. Dis. Child. 43:645, 1932.
9. Pemberthy, G. C., and Cooley, T. B.: Ann. Surg. 102:645, 1935.
10. Bazin, A. T.: Canad. M.A.J. 33:482, 1935.
11. Cowen, S. O.: Brit. Med. J. 1:690, 1936.
12. Dawson, B. E.: Brit. Med. J. 1:921, 1931.
13. Doan, C. A.: N. W. Med. 37:61, 1938.
14. Diamond, L. K.: Med. Clin. of N. Am. 21:401, 1937.
15. Sharp, J. C., and Davis, H. H.: J.A.M.A. 110:2053, 1938.
16. Doan, C. A., et al: Ann. of Surg. 104:892, 1936.

Primary Hepatic Carcinoma in Infancy[*]

Report of Two Cases

Ralph V. Platou, M.D.
Alan J. Hill, M.D.
Minneapolis, Minnesota

THE infrequency of large primary tumors of the liver in young infants leads us to add two such cases to the rather meagre literature on this subject. Different authors exhibit a surprising discrepancy in opinion as to the frequency of this lesion in infancy and childhood; but the majority consider it to be rare. Neither before nor since the two cases reported here came under our care, both within a single month, have either of the authors heard of a similar case in this community.

Since exhaustive reviews of the subject have been made fairly recently by Steiner[1] and by Charache,[2] repetition of such a review in the present paper would be superfluous.

Ewing[3] has classified forms of epithelial hyperplasia and tumors of the liver as follows:

1. Simple hypertrophy and hyperplasia
   a. Regeneration
   b. Congenital solitary hyperplasia
   c. Nodular hyperplasia in stasis, or cirrhosis
   d. Diffuse hyperplasia (diabetes).
2. Neoplastic hyperplasia
   a. Hepatoma
      (1) Adenoma
      (2) Adenocarcinoma
      (3) Carcinoma: solitary, multiple, atypical
   b. Cholangioma
      (1) Adenoma: solid, cystic
      (2) Adenocarcinoma
      (3) Carcinoma
   c. Mixed tumors.

In his textbook, he re-emphasizes the well-known fact that "there is a uniform gradation between nodular hyperplasia, multiple adenoma, and multiple carcinoma; that such a transformation of hyperplastic into neoplastic cells is characteristic of many tumors."

Incidence

Standard textbooks[4,5,6,7] mention primary carcinoma and adenoma of the liver only to emphasize their rarity and hopeless prognosis. Steiner[1] found 144 cases of primary carcinoma in 65,501 routine autopsies at all ages (an incidence of 0.219 per cent), and 77 of these were found in children under 16 years, 28 under 1 year of age; Charache[2] collected 808 instances in 159,762 autopsies (0.516 per cent) and to these he added other reported cases, bringing the total number up to 1,125 as of August 1937.

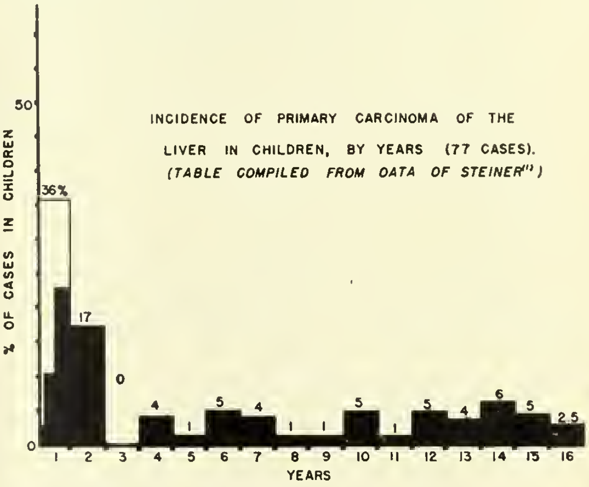

Fig. 1.

Of these tumors occurring in childhood, about 50 per cent are found in children under 2 years of age, and approximately 35 per cent under 1 year. Occasional cases have been discovered at birth (sometimes leading to dystocia) or during the first month of life, leading to the contention that primary carcinoma is often congenital in origin.

The frequency of occurrence of primary carcinoma of the liver in children, according to age, is shown in Figure 1.

Most authors agree that this lesion is about twice as common in males (63 to 68 per cent) as in females. Both cases reported herewith were males. Tumors arising from liver cells (hepatomas) are about twice as common as cholangiomas, though the latter occur more commonly in females.

The ratio of primary to secondary types of carcinoma of the liver has been estimated at from 1:21 up to 1:64 —the latter figure being most applicable to infancy, in our opinion.

Pathology

Cirrhosis is very frequently associated with primary carcinomata of the liver in adults (70 to 90 per cent). Ewing has stated that congenital maladjustment of groups of liver cells is more important in the pathogenesis of this lesion in infants and children than is cirrhosis, as the latter is rare in congenital cases.

In the gross specimen, the picture is varied and inconstant, with perhaps the majority of lesions occurring in the right lobe under the costal arch; the tumor may also be found in the left lobe, or coincidentally in both lobes. Affected areas may be single, but more often multiple; early in the course of the disease, these are found to be firm, white, and sharply circumscribed with a smooth level cut surface. Later, in the necrotic stage, they become softer, and green or yellow in color. They may project from the liver surface, or be deeply embedded; those on the surface often present a shallow depression at the center.

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[*] From the department of pediatrics, University of Minnesota.

Intrahepatic vascular invasion is a striking feature in hepatomas, while extrahepatic distant metastases are more common in the cholangiomas. In spite of this early and extensive intrahepatic vascular invasion and thrombosis, the usual case of primary carcinoma of the liver shows no distant metastases, probably because of the very fulminating nature of its course. When metastases do occur from hepatomas, however, they are usually found in adjacent structures, particularly the inferior vena cava, portal and hepatic veins, lymph nodes, or lungs. These close metastases are apt to be found in about 60 per cent of fatal cases.

Histologically, the tumor tissue consists of closely packed cords, tubes, and alveoli made up of cells surprisingly similar to those of the normal liver. Adjacent liver tissue shows pressure atrophy and necrosis.

Differential Diagnosis—(in infancy)

1. Other tumors
   a. metastatic in origin
      (1) mixed tumors of kidney (Wilm's)
      (2) adrenal embryomas or adenocarcinomas
      (3) cysts (amœbic, hyatid, etc.)
   b. primary in liver
      (1) hemangiomata
      (2) cysts[8]
      (3) sarcomata
2. Congenital syphilis of liver
3. Inflammatory hepatomegaly
   a. diffuse (often asymmetrical)
   b. localized
      —abscess, single or multiple
4. Leukemic infiltration.[9]

Symptomatology and Course

Usual textbook descriptions[4,5,6,7] state that many cases occur as accidental autopsy findings, giving rise to no other sign than enlargement of the organ. With the hepatomegaly, evidences of cachexia appear early, but icterus and ascites are surprisingly uncommon in infants and children.[10] The presence of a primary tumor in the liver may sometimes be suspected only because of associated pressure symptoms. Enlargement of the liver upwards, encroaching on the thoracic cavity, particularly from the right lobe of the liver, has been considered by some physicians as a particularly valuable diagnostic sign.

The onset of symptoms may be sudden or insidious, and the course is usually complete in less than four months. Surgical intervention in children has been attempted in only a few cases, and four successful results were cited by Wilens,[11] the youngest of these being 10½ months of age.

Report of Cases

J. D., 3½ months, male, was referred by Dr. C. H. Falstad of Eau Claire, Wisconsin. This infant was the firstborn of white parents, weighed 5 pounds and 9 ounces at birth, and the neonatal course in the hospital was uneventful except for minor difficulties in nursing. There had been three instances of cancer in the father's siblings. The baby was breast-fed, and received the usual amounts of cod liver oil, orange juice, and cereal. There had been no other diseases than the presenting complaint. He weighed 5 pounds and 5 ounces at two weeks, 7 pounds 7 ounces at six weeks, 8 pounds 9 ounces at three months, and 8 pounds 13 ounces at fifteen weeks.

At about the third week, periods of breath-holding were noted to be associated with hunger or colic. Aside from this, the infant seemed quite well until about three weeks before admission here, when these spells seemed to grow longer and occur more frequently. In some attacks, cyanosis and tonic convulsions were noted, often as frequently as three or four times daily. Ten days before admission, enlargement of the abdomen was obvious, but seemed to remain constant thereafter. The stools were not unusual, and the urine had not been highly colored.

Examination showed a hungry, pale, moderately dehydrated male infant with poor muscle tonus and evidence of recent weight loss. The temperature was 98 F (rectal), he weighed 8 pounds and 10 ounces (3905 gms.), the crown-heel length was 54.5 cm., the head measured 37 cm., the chest 34 cm., the abdomen at the costal margin was 41 cm. in circumference, and 35 cm. at the level of the umbilicus. The anterior fontanel was 3 cm. in greatest diameter.

The heart seemed enlarged, and fluoroscopically was found to be rotated upwards apparently by the mass from below, so that it had assumed a transverse position in the thorax. A loud systolic murmur was audible over the entire precordium, and was judged to be hemic in origin. Evidences of collateral circulation over the thorax and abdomen were very striking. There was a distinct bulge in the left upper quadrant and epigastrium, caused by a firm dull nodular mass measuring about 9 x 10 cm. on the surface, which did not transilluminate. The lower and lateral margins of this mass were sharp, and felt like liver; it was definitely tender, moved with respirations, and was not ballotable. A second mass could be felt below this large tumor apparently present in the left lobe of the liver, and it was questionable whether this represented enlarged spleen or liver. There was no purpura.

The hemoglobin was 46 per cent (Sahli), leucocyte count 10,100 per mm^3 with 41 per cent polymorphonuclear cells, 50 per cent lymphocytes, 3 per cent monocytes, and 6 per cent promyelocytes; the red blood cells showed hypochromasia, anisocytosis, poikilocytosis, and occasional erythroblasts were seen on the smear. The sedimentation rate (Westergren) was 6 mm. in one hour, and the blood calcium level was 9.1 mg. per cent. The clotting time was over 20 minutes, and the Wassermann reaction was negative. The urine was yellow and cloudy, acid in reaction, and contained albumin (+++), very occasional granular casts and red blood cells. Phenolsulphonephthalein excretion was delayed to 5 per cent in 90 minutes, 10 per cent in 2½ hours. An intravenous pyelogram also showed markedly delayed excretion, and demonstrated that the large mass in the abdomen, apparently liver, had no connection with the kidneys. The right kidney seemed normal in size, the left was poorly visualized, and neither was enlarged.

Within four hours after admission to the hospital, the temperature began to rise, and continued so until death occurred on the fifth day. Signs of bronchopneumonia accompanied this rise in temperature, and this obviously constituted the immediate cause of death. A transfusion of 75 cc. of the father's blood was given, and the first dose in a projected series of deep X-ray treatments (200 k.v., 30 ma., for 1½ minutes) was administered, neither of which seemed to have any appreciable influence on the course of the disease.

Autopsy (Dr. R. W. Koucky). There was a massive bronchopneumonia involving about 80 per cent of both lungs, only the apices and anterior portions containing air. The heart appeared normal, and showed no congenital anomaly. The spleen weighed 50 gm.—about

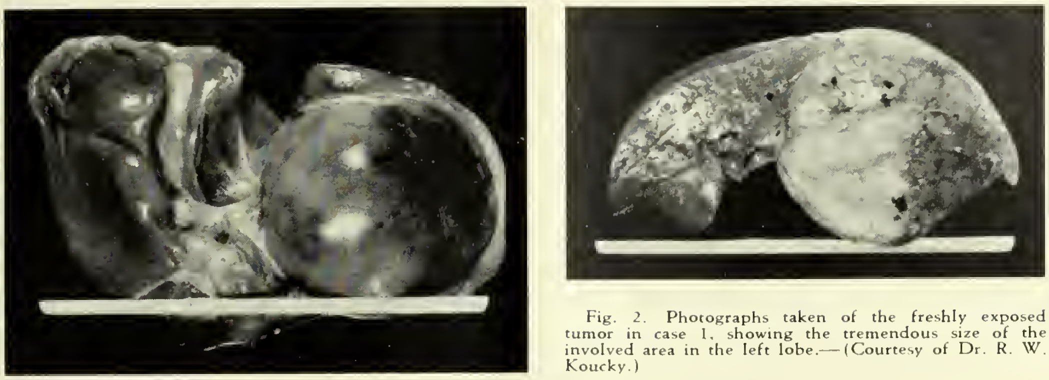

Fig. 2. Photographs taken of the freshly exposed tumor in case 1, showing the tremendous size of the involved area in the left lobe.—(Courtesy of Dr. R. W. Koucky.)

four times the normal weight for this age—and was firm, dark and congested.

The liver weighed 500 grams (normal: 140-160 gms), and due to the presence of the tumor in the left lobe was so rotated that it lay principally in the right and anterior portions of the abdomen. The tip of the right lobe projected into the pelvis. The entire left lobe was discolored, with a mottled yellow appearance, and the liver tissue was compressed into a pseudo-capsule. The tumor itself measured 7.5x8.5x9.5 cm. and projected mainly from the ventral surface and left periphery. The tumor felt both semi-fluctuant and solid. On cut section, about three-fourths of the tumor tissue was seen to be made up of greasy, semisolid, yellow-white apparently necrotic tissue; the remainder was more firm, having a green color resembling deeply jaundiced liver tissue. The tumor comprised about half the total cut surface of the liver. There were no enlarged nodes nearby, and no other evidences of metastases. The gross appearance of the tumor in situ is illustrated by the photograph in Figure 2.

Histologically, the spleen showed only passive congestion, the kidneys showed swelling of the glomeruli and cells in the convoluted tubules. Sections of liver taken from the area overlying the tumor in the left lobe showed extreme pressure atrophy, with only regenerating liver ducts remaining. The green part of the tumor was made up of remarkably well-formed liver tissue, while in the white areas the liver cells were growing in irregular spaces suggesting tiny cysts, within which the liver cells grew in shapes resembling small papillomas—indicating carcinomatous degeneration.

The remainder of the postmortem examination, including the head, showed nothing unusual.

Conclusions: (1) Hepatoma (carcinoma), (2) Bronchopneumonia, (3) Passive congestion of spleen, (4) Cloudy swelling of kidneys.

W. G., a first-born Indian male infant, age 2 months, was referred by Dr. C. J. Picard of Red Lake, Minnesota. The birth had been normal, the infant weighing 7 pounds, but discoloration and swelling of the left scrotal sac appeared when the infant was about twenty-four hours old, and he did not void until he was catheterized at thitty-six hours. On the third day of life, moderate icterus developed, and cleared slowly during the following week, so that the skin was clear when mother and child left the hospital on the eleventh day postpartum. The scrotal swelling decreased after the third day, and had disappeared by the tenth day.

When the infant was six weeks old, he was brought to the physician because of extreme abdominal distention, which was relieved by rectal irrigations and the passage of large amounts of flatus. At this time, a large hard tender mass was found, extending from the righr costal margin to the level of the umbilicus, and believed to be liver. Evidences of collateral circulation on the anterior abdominal wall were noted at that time. The blood Wassermann was negative. The infant had been breast fed, and received adequate quotas of cod liver oil and orange juice.

The patient was brought to the University Hospitals when two months of age. The temperature on admission was 100.4 F. (rectal), pulse 170, and respirations 40. The length was 57 cm., crown to heel, and 38 cm., crown to rump, the head circumference 38.5 cm., chest 36 cm., and abdomen 37 cm., at the level of the umbilicus. The infant appeared well nourished, active, and in only mild distress, with moderate distention of the abdomen. Collateral circulation over the surface of the thorax and abdomen was quite distinct. The mass, as previously described, was firm in consistency, nodular, tender, did not transluminate, and filled the entire right side of the abdomen, extending from the costal margin into the iliac fossa, and from the flank beyond the midline. There was a question as to whether a liver margin could be palpated about 2 cm. below the costal margin on this same side, overlying the larger mass. The remainder of the examination showed nothing of interest but the moderate pallor.

The hemoglobin was 65 per cent (9.18 gms., Sahli), and there were 2,800,000 erythrocytes, 7,300 leucocytes per mm^3, of which 50 per cent were polymorphonuclear, 47 per cent lymphocytes, and 3 per cent monocytes. The blood Wassermann reaction was negative. The hematocrit was 37 per cent, MCV 95, MCH 26.4, and MCHC 27.8. The reticulocyte count was 0.7 per cent. The serum calcium level was 11.1 mg. per cent, phosphorus 2.9 mg. per cent, icterus index 7, and the blood cholesterol was 297 mg. per cent. The fasting blood sugar was 63 mg. per cent; 10 minutes after the injection of 0.2 cc. of adrenalin 1:10,000, this had risen to 112 mg. per cent. Glucose tolerance showed a fasting level of 77, 86 at ½ hour, 91 at 1 hour, 105 at 2 hours, 105 at 3 hours. The prothrombin time was normal.

Routine urinalyses showed no abnormalities, and the urine contained no urobilin or urobilinogen; the feces gave positive tests for urobilin, negative for bilirubin.

X-rays demonstrated the large mass, probably liver, displacing the colon into the pelvis, the long bones were normal, and an intravenous pyelogram showed no abnormality. Repeated X-rays of the chest showed increasing compression of the thoracic cavity from below, and the development of terminal pneumonia.

During his final month of life in the hospital, this infant had several bouts of fever associated with respiratory infections. The tumor gradually increased in size up to the time of death, but there was never any appreciable amount of icterus, and no purpura developed. Terminally, bronchopneumonia and otitis media appeared (pneumococcus type XXIV and staphylococci) to hasten the otherwise progressive downhill course.

One course of sulfathiazole (0.15 gm./kg./24 hours, for 6 days) was given with an entirely satisfactory result as far as the pneumonia was concerned and no evidences of toxicity from the drug, which was given with some trepidation because of the extensive liver involvement. Four transfusions were given, with no apparent effect, the hemoglobin never rising above 10.25 gms. The tumor increased in size steadily, while dyspnea, tachypnea, and increasing abdominal distention became more marked. Ascites could never be diagnosed clinically. An attempted diagnostic puncture of the tumor mass yielded only blood.

Autopsy (Dr. Richard Lien). The peritoneal cavity contained about 100 to 150 cc. of hemorrhagic fluid. The liver was markedly enlarged, extending to the right iliac crest, and weighed 950 gms. (normal 140-160 gms.); the right lobe was made up almost entirely of tumor tissue. The anterior and inferior surfaces of the tumor were covered with a network of dilated vessels. The tumor was cystic in consistency, and on section contained reddish firm fleshy areas along with whitish areas of apparent fatty degeneration and necrosis.

Histologically, sections through the left lobe of the liver revealed two tiny adenomata, made up of closely packed hepatic-type cells with a clear cytoplasm, often in acinar patterns. Sections of the large mass in the right lobe of the liver showed well differentiated liver cells, arranged in peculiar patterns, and several areas of hemorrhage, always surrounded only by hepatic parenchyma.

The remainder of the examination showed nothing of note. The head was not examined.

Conclusions: (1) Primary hepatoma (carcinoma), (2) Hemoperitoneum.

Comments

Both of these male infants showed practically identical clinical and pathological features. In neither case did purpura, ascites, or icterus constitute any significant part of the symptomatology, though in the second case some hemorrhages into the substance of the liver as well as a small amount of ascites were discovered at necropsy.

In line with experimental evidence for a tremendous "hepatic reserve," it is probably not surprising that neither of these infants exhibited any symptoms or signs of suppressed liver function.

Both cases are perhaps best classified as hepatomas—neoplastic hyperplasia of hepatic tissue—perhaps more accurately as true primary hepatic carcinomas. A congenital basis for these neoplasms is suggested by the age of the patients and the rapid course of the malignancy in both instances, but this cannot yet be accurately established.

Summary and Conclusions

1. Two cases of primary carcinoma of the liver in young infants (aged 2 months and 3½ months) are described.

2. The symptomatology during infancy and childhood is briefly reviewed, and attention is called to certain misleading features in the clinical picture.

3. Early exploration and biopsy, followed by excision in proven cases, offers the only hope for cure.

Bibliography

1. Steiner. M. W.: Primary Carcinoma of the Liver in Childhood, Am. J. Dis. Child. 55:807 (April) 1938.
2. Charache, H.: Primary Carcinoma of the Liver, Am. J. Surg. 43:96.
3. Ewing: Neoplastic Diseases, ed. 4, pp. 740-41; Philadelphia, Saunders, 1940.
4. Holt and McIntosh: Holt's Diseases of Infancy and Childhood, ed. 11; New York, D. Appleton-Century, 1940.
5. Brenneman: Practice of Pediatrics III:10:2; Hagerstown, Md., W. F. Prior.
6. Pfaundler & Schlossmann (Peterman): The Diseases of Children; Philadelphia, Lippincott, 1935.
7. Weiss, S.: Diseases of the Liver; New York, Paul B. Hoeber, Inc., 1935.
8. Stoesser, A. V., and Wangensteen, O. H.: Solitary Nonparasitic Cysts of the Liver, Am. J. Dis. Child. 38:241 (August) 1929.
9. Kelsey, W. M., and Andersen, D. H.: Congenital Leukemia, Am. J. Dis. Child. 58:1268 (Dec.) 1939.
10. Griffith, J. P. C.: Primary Carcinoma of the Liver in Infancy and Childhood, Am. J. M. Sc. 155:79, (Jan.) 1918.
11. Wilens, G.: Adenoma of the Liver, Am. J. Dis. Child. 55:792 (April) 1938.

U. S. MISLED BY DRAFT STANDARDS

Americans are unnecessarily disturbed over the health of their youth as a result of misleading information concerning the rejection of young men by the military service for physical defects, states Col. Leon Gardner, of the Office of the Surgeon General of the War Department, Washington, D. C. The figure of 45 per cent of the youth being unfit was based on very rigid standards of selection used while the United States was still at peace, and is wholly misleading as an indication of the health status. American youth will prove superior in stamina and endurance to the foe after proper training, Colonel Gardner declared.

Infected Cysts of the Lung

A Source of Pulmonary Suppuration

Leo G. Rigler, M.D.†
Minneapolis, Minnesota

THE interest attached to cystic disease of the lungs is attested by the voluminous literature on the subject. Schenck,[11] in 1936, collected some 130 major references and in 1937[12] reviewed 381 reported cases. Since that time numerous other important contributions have been made. A review of the literature is not within the purlieu of this paper, but adequate references may be found in the papers of Adams and Swanson,[1] Schenck,[12] Sante,[10] Peirce and Dirkse,[7] Maier and Haight,[6] and many others.

Aside from echinococcus and dermoid cysts which are not to be considered here, the etiology of most of the pulmonary cavities, grouped together under the name of lung cysts, is not entirely clear. The various terms used to name this condition number no less than twenty and have been well described in the literature.[3,4] Cysts of the lung are often designated as noninflammatory, although they may be the sequel of an inflammatory process and they may become secondarily infected; they may be either congenital or acquired, bronchial or parenchymal in origin, single or multiple, and they may contain fluid, gas, or both. It is evident from this brief description that a variety of structural abnormalities are likely to be included under this one classification.

Regarded as something of an academic problem two decades ago, lung cysts were thought to be rare and of relatively little clinical significance. The striking advances of thoracic surgery in the past ten years which have made it possible to institute curative procedures have greatly enhanced the importance of such a diagnosis.

The origin of lung cysts has been the subject of a voluminous literature particularly in relation to the question of their acquired or congenital character. As indicated in the introduction, a great variety of lung abnormalities have been lumped together under this one terminology. Until recently almost all cysts were considered to be congenital in origin. In 1935 the author[8] reported a case in which a large air cyst developed in the left upper lobe following the cavitation of a staphylococcic pneumonia. Peirce and Dirkse[7] have demonstrated effectively that many cysts are acquired, particularly in early childhood, although they may even arise in later life.

Lung cysts have been classified in a number of ways, but the one most commonly used is that of Anspach and Wolman.[2] This concerns itself essentially with the congenital malformations and no provision is made for other types of cysts. According to Anspach and Wolman, cysts begin as fluid-containing cavities, either single or multiple. If communication with a bronchus does not occur the cyst remains filled with fluid. If communication does occur, air will enter the cavity and the degree of expansion will depend upon the character of the communication. If the latter is valvular, a balloon or expansile cyst, or multiple expansile cysts may develop. If the communication is free either a fluid and air cyst or a simple air cyst will result.

Peirce and Dirkse[7] added the term "pneumatocele" and presented a much simpler but more inclusive classification which includes the group of acquired lesions. This is as follows:

1. True congenital cysts—containing fluid, air, or both.
2. (a) Chronic interstitial pneumonitis with emphysema. (b) Chronic bullous emphysema.
3. Cystic bronchiectasis, either congenital or acquired.
4. Pulmonary pneumatocele — localized alveolar or lobular ectasia, acquired as a result of pneumonia or pulmonary abscess.

The question has been raised[7] as to whether any lung cysts are developmental in origin, but I believe there should be no doubt in this matter. I have had occasion to observe a number of such cases in which the cystic area was clearly present at birth. A characteristic case of this type was reported by Swanson, Platou and Sadler[13] in which a cyst, filled with fluid, was present at birth.

We have been fortunate in having the opportunity to observe on the Pediatric Service of Dr. Irvine McQuarrie at the University Hospital, a patient in whom the congenital origin of the cysts could be clearly established and their later evolution into infected, suppurative cavities could be followed. The early history of this patient has already been reported in a previous publication[9] but the case is of such informative value that the whole record will be reported here in detail.

Case Report

M. B., a boy, was born by spontaneous delivery in the University Hospital December 10, 1940, after a normal pregnancy. At birth the anus was not patent but a small opening was finally discovered and dilated by catheters following which meconium was readily passed. There was also cyanosis of intermittent character.

The physical findings were negative but a roentgenogram of the chest made on the day of birth revealed some density of the medial portion of the left lung and multiple rounded areas of rarefaction in the remainder of the left lung. The heart was displaced to the right. Within a few days the cysts expanded further until they filled most of the left hemithorax (fig. 1). Repeated roentgen examinations thereafter, until the child was four months of age, showed some slight increase in expansion of the cysts with further displacement of the heart to the right.

A mass was felt in the left upper quadrant corresponding to the left kidney. Excretion urography revealed an absent or nonfunctioning left kidney.

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†Department of radiology and physical therapy, University of Minnesota.

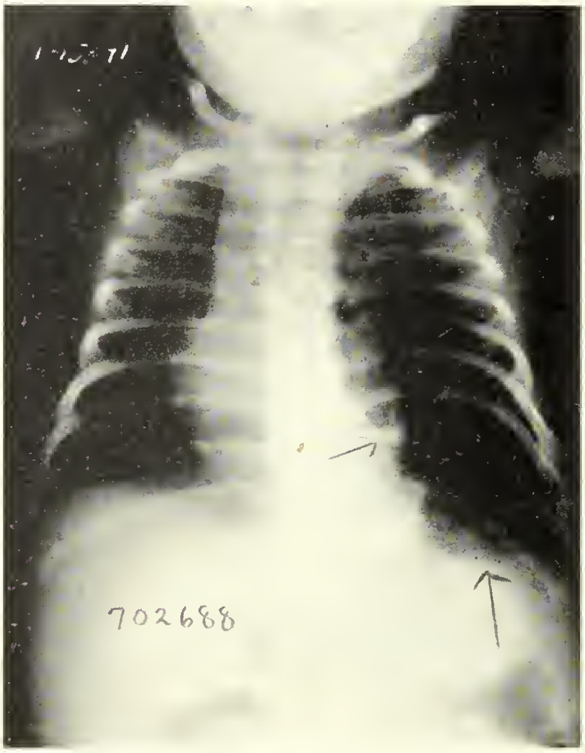

Fig. 1. Postero-anterior roentgenogram a few weeks after birth. Note extensive air cysts in left lower (arrows) depressing diaphragm and displacing heart to right. No evidence of fluid, inflammation, nor of involvement of the right lung is apparent.

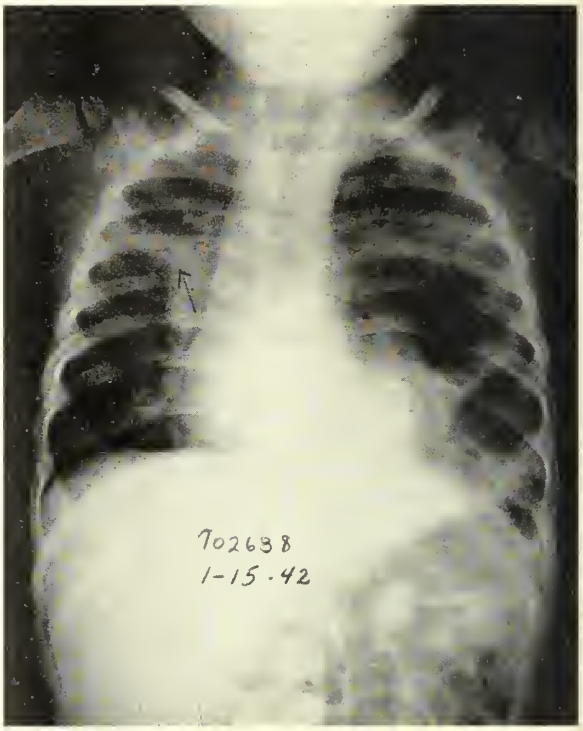

Fig. 2. Postero-anterior roentgenogram at age of 13 months. Note multiple cysts with atelectatic lung between. Fluid is present and other evidences of inflammation. Note cyst in right upper lobe.

The infant left the hospital February 24, 1941, in good condition, without respiratory symptoms. He gained weight and developed normally.

On January 8, 1942, he developed a cough, fever and dyspnea. There was some discharge from the eyes but no other signs. On entrance to the hospital on January 15, 1942, his temperature was 105, pulse 150, and respirations 60. He had respiratory distress and an irritating cough. Breath sounds were suppressed on the left, there were rhonci and, after coughing, medium moist rales in both lungs. The heart was shifted to the right. There was evidence of bilateral otitis media.

The leucocyte count was 35,600. The remaining laboratory findings were insignificant.

Roentgen examination (fig. 2) showed a striking change from the last examination nine months before. The multiple cysts on the left showed thick walls with areas of atelectatic or consolidated lung between. Fluid was present in some of the cavities and there were many evidences of suppuration. A large cyst was found in the right upper. This was not visible on any of the earlier roentgenograms.

Re-examination February 2, 1942 (fig. 3A) showed a marked accumulation of fluid in the cysts. In the lateral view (fig. 3B) there was shown a rounded massive dense shadow projecting anteriorly and resembling somewhat the appearance of encapsulated empyema. This, obviously, represented one of the cysts, expanded and filled with fluid.

On February 4, 1942, 40 cc. of purulent fluid was removed from the cyst in the left lung. The culture was sterile. Roentgen examination thereafter showed evacuation of one of the cysts.

The temperature continued to fluctuate but gradual improvement occurred. He was discharged much improved on February 11, 1942. His final X-ray examination indicated considerable evacuation of the cavities in the left lung but some fluid still remained.

The fact that lobectomy may now be done with a relatively small risk makes possible the extirpation of an infected cyst and thus the cure of a patient with chronic pulmonary suppuration. This can best be illustrated by the history of the following case already reported in detail elsewhere.[9]

CASE REPORT

History. A woman, 22 years old, was admitted to the University Hospitals because of a cough with purulent expectoration, apparently the residue of an operation for empyema. In October, 1939, she had developed a cold followed by a cough with fever. This became productive and she began raising foul sputum December 1, 1939. X-ray examination was first made on February 29, 1940, at which time a pocket of fluid and air was found in the left posterior chest. This was diagnosed "encapsulated empyema" and a rib resection was done on March 15. She improved greatly and the drainage tube was removed in three weeks. Shortly therafter she had a recurrence of fever and cough. Another attempt at drainage was made in July but was unsuccessful. She developed recurrent attacks of coughing with expectoration, chills and fever.

Her past history was of great significance. At the age of 4 she had "influenza", coughed, and was ill a long time. At 13 she had "pneumonia and pleurisy" and two years later she had "left lung pneumonia." Since that time she has had a cold with a cough each winter. She was injured in an accident in 1937 and was told she had a hemorrhage in her lung.

Examination. On entrance the physical signs indicative of a mass in the left posterior chest were found but there were no rales nor other evidences of active inflammation. The leucocyte count was only slightly elevated and the temperature was only a degree above normal. One hundred and twenty-five cc. of foul pus was aspirated from the left chest.

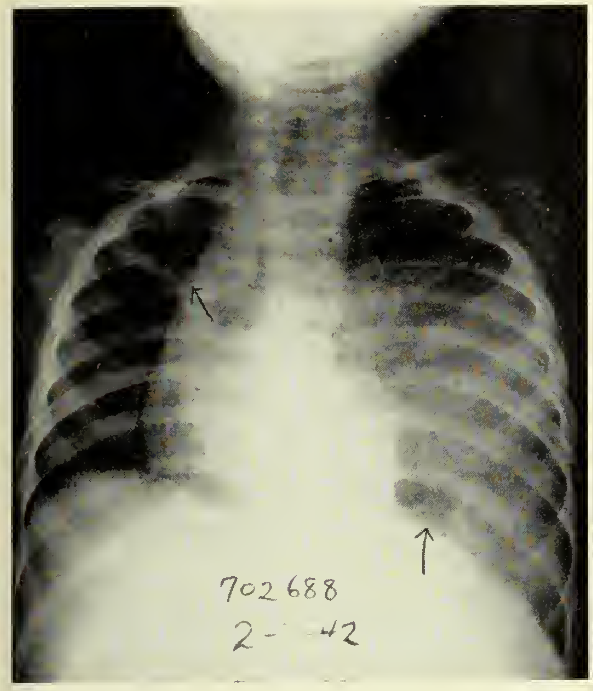

Fig. 3A. Postero-anterior roentgenogram 18 days after Fig. 2. One large cyst on left has filled up with fluid giving appearance of encapsulated empyema. Note air-filled cyst above left diaphragm and in right upper (arrows). The heart is more displaced.

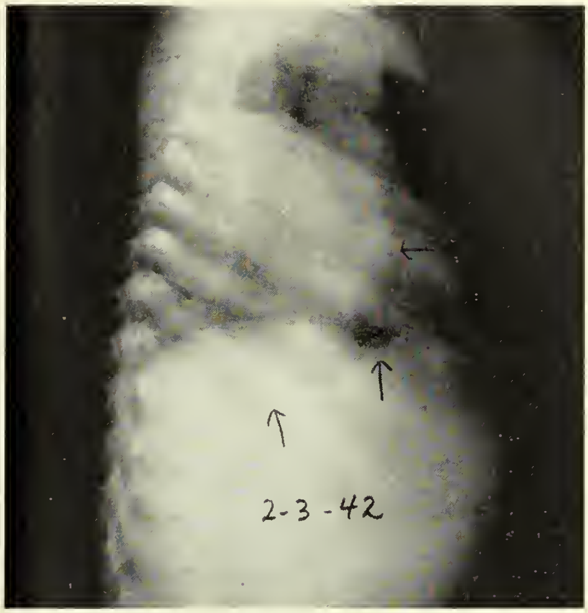

Fig. 3B. Lateral view on same date as Fig. 3A. The fluid-filled cyst is shown bulging anteriorly and below the diaphragmatic shadow (arrows). The appearance simulates encapsulated empyema. 40 cc. of pus was aspirated at this time.

X-ray examination at this time revealed a large pocket of fluid and air in the left posterior chest. This measured about 9 cm. in diameter, was sharply outlined, and reached the posterior chest wall. It lay very low, the inferior margin reaching the 11th posterior interspace. The diaphragm was not elevated, the heart was slightly displaced to the right and there was no evidence of thickening of the pleura elsewhere in the left chest. The cavity was round and did not extend out from the posterior pleura in a semicircle as is the case in encapsulated empyema. The absence of the characteristic findings of encapsulated empyema listed above, the absence of signs of collateral inflammation in the remainder of the right lung and pleura, the sharp definition and the relatively thin wall of the cavity all led to a diagnosis of possible lung cyst. The history of repeated lung infections was confirmatory. Comparison with the films made elsewhere seven months earlier showed practically no change, which tended further to fortify the diagnosis.

Operation. On October 23, Dr. John Paine resected the 12th tib and inserted a drainage tube with rapid and complete evacuation of the pus which was present. A thin shell of lung around a large cavity was found. At the same time he removed a section of the wall of the cavity for *microscopic examination* which was done by Dr. Robert Hebbel. Typical stratified epithelium characteristic of bronchial mucosa was found. This established beyond doubt that this was a lung cyst, as a bronchiectasis could readily be ruled out from the size and singleness of the cavity.

After drainage had been established, the cough and pain ceased, the slight fever disappeared. Suction was instituted and there was some tendency toward collapse of the wall from the expanding lung. The patient was sent home to get rid of all infection.

In January, 1941, the patient returned and resection of the left lower lobe was done by Dr. O. H. Wangensteen. The postero-inferior half of the lobe was occupied by a large cyst lined with bronchial epithelium. Within it were a number of interlacing trabeculae. The patient made a good recovery and now is entirely well.

Comments

It is difficult to explain the finding of air cysts on the day of birth on any but a congenital basis. As pointed out by Adams and Swanson[1] there are an appreciable number of such cases reported in which either gas or fluid containing cysts have been found on the day of birth. These present the strongest possible evidence that the lesion is congenital.

The unique feature of the first case, however, is the demonstration of the onset of suppuration within the cysts. I feel certain that if this patient had been seen for the first time, at the age of 13 months, in the condition exhibited on his second admission to our hospital, the diagnosis of multiple lung abscesses or encapsulated empyemata with bronchopleural fistula would have been made. It appears reasonably certain that many of the patients seen later in life have suffered many such attacks as that described above. Usually these are diagnosed pneumonia but when free fluid appears and is aspirated the diagnosis of encapsulated empyema with bronchial fistula will appear to be established.

Possibly our experience has been unusual but I am inclined to believe that infected cysts may be more common than is generally believed. At any rate such a diagnosis should be strongly considered in any case of chronic lung suppuration.

There are a number of important features to be learned from the second case discussed. The history of repeated lung infections beginning early in childhood, all of them regarded as respiratory infections or injuries, is characteristic. Such a history should at once arouse the suspicion that an infected cyst may be the causative factor of the pulmonary lesion. Persistence of the empyema after drainage adds weight to this conclusion.

The X-ray findings which point to the possibility of a lung cyst have already been described. The practical importance of the roentgenographic diagnosis of lung cyst in this particular case lay in the stimulus to the surgeon to do a biopsy at the time of drainage and thus to establish clearly that this was not an encapsulated empyema or lung abscess. It was evident from the history that this patient had been suffering from recurrent infections of the cyst and that repeated drainages would only be temporary in their effect. Maier and Haight[6] have recently directed attention to the likelihood of infected lung cysts simulating encapsulated empyema. They emphasized the importance of biopsy in cases thought to be chronic empyema. A number of investigators[5,6,9] have pointed out that cysts of the lung, which have become infected, will rarely be cured without either complete removal or destruction of the secreting lining of the cavity. An earlier diagnosis of cyst in this patient might have saved her a long period of suffering and the possible deleterious systemic effects of prolonged pulmonary suppuration.

We have observed several additional cases of this type and are convinced that persistent suppuration in the chest, such as empyemas which respond poorly to drainage, or chronic lung abscesses, should be investigated to determine whether or not they originated as a lung cyst. Radical surgical treatment is indicated in the latter case and should be applied wherever feasible.

Summary

A case is reported to illustrate, in a new-born boy, the presence of air cysts and their evolution into infected suppurative cavities within a year.

Infected cysts of the lung may simulate encapsulated empyema or lung abscess. Complete extirpation of the lobe containing such a cyst is necessary to effect a permanent cure. It is important, therefore, to consider this diagnosis and to make a biopsy from the wall of such a cavity to establish it firmly.

Bibliography

1. Adams, W. E., and Swanson, W. W.: Internat. Clin. 4:205, 1935.
2. Anspach, W. E., and Wolman, I. J.: Surg., Gynec., & Obst. 56:635, 1933.
3. Bruce, T.: Acta med. Scandinav. 102:295, 1939.
4. Diamond, S., and Durham, W. R.: Amer. Rev. Tuberc. 41:719, 1941.
5. Eloesser, L.: Radiology 17:912, 1931.
6. Maier, H. C., and Haight, C.: J. Thoracic Surg. 108:274, 1937.
7. Peirce, C. B., and Dirkse, R.: Radiology 30:248, 1938.
8. Rigler, L. G.: Radiology 24:489, 1935.
9. Rigler, L. G.: Internat. Clin. 4:204, 1941.
10. Sante, L. R.: Radiology 33:152, 1939.
11. Schenck, S. G.: Am. J. Roentgenol. 35:604, 1936.
12. Schenck, S. G.: Arch. Int. Med. 60:1, 1937.
13. Swanson, W. W., Platou, E. S., and Sadler, W.: Am. J. Dis. Child. 35:1024, 1928.

ROENTGENOGRAPHY OF ALL SERVICE MEN

Mass roentgenography of all service men, as a means of finding and weeding out all cases of pulmonary tuberculosis in the Army, Navy and Marine Corps before further infection occurs among other soldiers, is urged by Dr. Nelson Mercer, former lieutenant colonel of the Medical Corps Reserve, of Chestnut Hill, Pa. On the basis of X-ray films of chests made in two army corps areas, where rejections average ½ per cent to 1½ per cent on X-ray findings alone, there are an estimated 5,000 to 15,000 cases of tuberculosis per million men now in the service.

There are three rapid low cost methods to be considered: the 35 mm. film, which costs about one cent per exposure; the 4x5 film, about five cents; and the 14x17 film, twenty-five cents. The more expensive film makes possible greater diagnostic accuracy. If the average cost of admitting a tuberculous man into the military service is $10,000, the most expensive method of diagnosis might prove to be the most economical; if only one extra case per 10,000 men was found and rejected, it would save the government $7,600.

Impaired Ability to Fabricate Serum Proteins the Chief Cause of Edema in Chronic Constrictive Pericarditis*

Irvine McQuarrie, M.D.
Minneapolis, Minnesota

As a result of an investigation into the underlying cause of hypoproteinemic edema in a young child presenting no evidence of renal, cardiac, or nutritional deficiency, the author and his collaborators[1,2] were forced to the novel conclusion that edema may occur under certain conditions because of the body's inability to fabricate serum proteins at a normal rate. The two year old patient concerned in that investigation showed symmetrical decreases in the serum proteins to approximately half of normal values over a period of many months, in spite of an adequate diet and maintenance of a strongly positive nitrogen balance. At no time did she show protein in the urine, and the loss of protein by way of the ascitic fluid was insignificant. Edema disappeared promptly following a single transfusion of blood, which was sufficient in amount to raise the serum protein concentration above the critical level for edema formation. After a period of nearly two months, during which she was practically edema free, the serum protein levels gradually declined, and generalized edema recurred. When the patient died rather suddenly following operation for acute mastoiditis, the only visceral lesion found at autopsy was an unusual type of non-inflammatory atrophy or aplasia of the liver lobules. This observation was interpreted as confirmation of the theory that the liver is the chief site of serum protein production.

In 1933 Myers and Taylor[3] reported similar clinical and laboratory findings in the case of a man 51 years of age, who likewise suffered from chronic hypoproteinemic edema apparently due to his inability to produce serum proteins at a normal rate. A decrease in serum proteins in liver cirrhosis with ascites and edema has been observed by various authors.[4,5,6] The usual explanation for this phenomenon, however, has been that of protein underfeeding resulting from anorexia and the edema, as well as the ascites, has been ascribed to the increased hydrostatic pressure from venous obstruction. Myers and Keefer[7] found that certain patients with advanced hepatic cirrhosis lost significant amounts of serum proteins into ascitic fluid, when this was removed frequently in large amounts. They concluded, however, that such patients might suffer also from impaired ability to manufacture serum proteins, particularly the albumin fraction. Inability to fabricate serum proteins was assigned as the cause of edema in two infants with severe congenital syphilis of the liver seen by the author.

In 1941 Stadler and Stinger[8] reported valuable studies on a case of Pick's syndrome with obliterating adhesive pericarditis. They demonstrated the patient's inability to fabricate serum proteins, particularly albumin, during life and attributed this to extensive liver damage which was found at autopsy. The purpose of the present paper is to report studies on a similar case. However, the latter patient recovered the ability to produce serum proteins following surgical relief of the constrictive pericarditis.

Summary of Case

R. G., an 8 year old boy, was referred from the Minneapolis General Hospital to the University of Minnesota Hospital on June 28, 1935, for special clinical investigation because he had developed edema and ascites of undetermined origin after a bizarre illness covering a period of approximately 18 months. He had been admitted to the Minneapolis General Hospital first in February, 1934, because of generalized lymphadenopathy, anorexia, and indefinite pain in the right side of the abdomen and chest for three weeks. While under observation there, he showed a low-grade fever, moderate enlargement of the liver and spleen, and mild secondary anemia. Biopsy of a lymph node revealed the presence of a mild chronic inflammatory reaction. X-ray of the chest showed what was interpreted as a "mitral-type" of heart shadow, and the electrocardiogram gave evidence of myocardial damage. However, there was no evidence of mitral disease from physical examination. A glucose tolerance test was normal.

After one month in the hospital he was discharged in a considerably improved condition without a definite diagnosis. His clinical course at home was characterized by occasional episodes of low-grade fever and ill-defined pains in the chest, especially when he coughed. In April, 1935, he returned to the Minneapolis General Hospital with the complaints of weakness, some dyspnea on exertion, and slight swelling of the face. Examination (both physical and X-ray) at that time showed the heart to be slightly enlarged, and the question of a small pericardial effusion was considered without final decision. X-ray examination showed increased lung markings suggestive of pulmonary congestion. The liver edge was now palpable 2.5 cm. below the costal margin in the mid-clavicular line, but was smooth. The renal function appeared to be quite normal, the phenolsulphonephthalein excretion test showing 75 per cent output in two hours and the blood urea and uric acid nitrogen being 11.9 and 1.4 mg. per 100 cc. respectively. The urine was entirely normal except for a faint trace of albumin on one occasion. The plasma cholesterol was 180 mg. per cent, and the protein values were: albumin 4.64 per cent, globulin 1.40 per cent, and fibrinogen 0.19 per cent. Hemoglobin was 89 per cent.

On admission to the University Hospital he showed a moderate degree of generalized edema, as well as moderate ascites and hydrothorax. He showed no dyspnea when allowed to walk around the ward, and no definite cyanosis of extremities or lips was apparent. The veins

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*From the department of pediatrics, University of Minnesota.

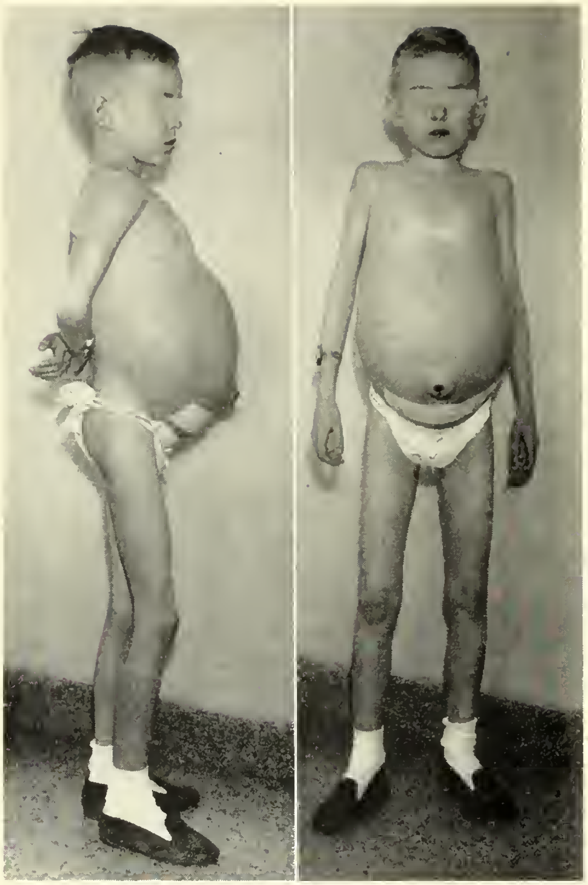

Fig. 1. R. G., age 11 years. Taken when edema was minimal following blood transfusions and use of mercurial diuretics. Note cyanosis of lips, prominence of superficial veins and degree of ascites before pericardiolysis was performed.

over the abdomen were visible but were not extremely prominent. The heart sounds were regular but were slightly indistinct. No murmur was audible. There was no evidence of cardiac enlargement. Electrocardiogram showed sinus tachycardia only. The blood pressure averaged 100 mm. of mercury systolic and 70 diastolic. The urine showed no albumin, blood cells, or casts, and tests of kidney function were normal. The hemoglobin varied between 71 and 88 per cent. The blood lipids were all within normal range. The tuberculin and Wassermann tests were negative. The most striking and persistent abnormality was a marked lowering of the serum proteins, which appeared to explain the edema and ascites satisfactorily. Over a six-months period, during which the serum proteins were determined ten times, the albumin fraction varied between 1.77 per cent and 2.97 per cent and the globulin between 0.95 per cent and 2.2 per cent. Since these low values persisted in spite of a comparatively high protein intake (2 to 3.5 gm. of animal protein per kilogram of body weight per day) and fairly frequent blood transfusions, insuring a continuously positive nitrogen balance, it was concluded that the patient probably suffered from some obscure hepatic disorder which impaired his capacity to convert absorbed amino acids into serum proteins. After the edema and ascites had partially subsided following a temporary increase in serum proteins as a result of several closely-spaced blood transfusions, he was discharged from the hospital on January 8, 1936, with the *tentative diagnosis of hypoproteinemic edema of undetermined cause.* During the following two years at home, his clinical course appeared to remain essentially unchanged, except for increase in the edema and ascites toward the end of this time.

On February 28, 1938, however, he was readmitted to the University Hospital complaining of diarrhea and rapidly increasing ascites, generalized abdominal discomfort, weakness, and shortness of breath on exertion. Examination at that time showed increased edema of the extremities, face, and scrotum, and greatly increased ascites. The patient was somewhat dyspneic. His lips were slightly cyanotic and the veins over the abdomen were much more prominent than at the time of his last discharge from the hospital. Withdrawal of 4 liters of ascitic fluid relieved the dyspnea and abdominal discomfort measurably and facilitated palpation of the liver. For the first time the liver was felt to be somewhat firm and nodular. Before any blood transfusion was given the serum albumin was 1.75 per cent and the globulin 1.01 per cent, making a total of but 2.76 per cent protein. Ascitic fluid removed periodically thereafter showed from 0.2 per cent to 0.9 per cent protein.

In spite of occasional blood transfusions and a relatively high intake of animal protein which resulted in maintenance of a positive nitrogen balance over a period of 8 months (protein of blood given and of ascitic fluid removed included in calculations), the patient's hypoproteinemia, as well as his edema and ascites, persisted. Periodic removal of ascitic fluid in amounts varying between 2 and 5 liters and the use of mercurial diuretics gave temporary relief to the patient, but the fluid gradually reaccumulated. Ordinary liver function tests revealed no measurable impairment of hepatic function, and the icteric index was within normal limits.

Because the symptoms of impaired circulation now became more prominent and failed to be relieved to the extent expected by abdominal paracentesis, special examinations were made to recheck an earlier impression that constrictive pericarditis might be present. Figure 1 shows the appearance of the patient just after his edema had been reduced temporarily by a large blood transfusion and repeated doses of salargan. The pulse was small and rapid, and blood pressure readings averaged 95 mm. of mercury systolic and 62 mm. diastolic. The venous pressure (supine position) varied between 200 and 365 mm. of water and showed a steady fall to 150 mm. when large quantities of fluid were withdrawn from the peritoneal cavity. The electrocardiographic examinations showed no shift in axis with changes in position. X-ray of the chest now showed a more extensive increase in the lung markings than formerly, suggesting more intensive pulmonary congestion. Kymographic studies of the heart, as well as fluoroscopic examination, showed marked reduction in the pulsations of the heart. The circulation time was greatly increased. On the basis of these findings the final diagnosis was established as follows: (1)

chronic constrictive pericarditis, (2) *secondary atrophy and cirrhosis of the liver,* (3) *secondary hypogenesis of serum proteins,* (4) *edema, ascites and mild hydrothorax.*

On November 25, 1938, pericardiolysis was performed by Dr. Wangensteen. The pericardial sac was found to be completely obliterated by firm fibrous adhesions. When those over the ventricles were divided and partly removed, the heart's action was visibly improved within a comparatively short time. Adhesions about the base of the auricles, however, could not be removed so satisfactorily. This probably accounted for the fact that some of the signs of obstruction to the return flow to the heart, such as the increased venous pressure, pulmonary congestion and dyspnea, did not disappear completely immediately after the operation.

Following several transfusions of human serum and removal of fluid from the chest and abdominal cavities, however, the symptoms gradually abated. The edema disappeared entirely before January 1, 1939. The serum protein values were then found to be well within the normal range for the first time in four years. They remained normal (albumin, 3.4 to 4.3 per cent; globulin, 2.7 to 3.4 per cent) throughout the remainder of the patient's stay in the hospital. The necessity for removing ascitic fluid gradually became less urgent up to the time of his discharge (March 3, 1939), when it was discontinued entirely. Edema never recurred.

At the time of the patient's first return visit to the pediatric and surgical outpatient clinics on April, 1939, he was asymptomatic and showed no evidence of ascites, edema or dyspnea on moderate exertion. He had returned to school shortly after going home and reported that he was soon able to play baseball with the other boys. His appearance at that time is illustrated by the photographs shown in Figure 2.

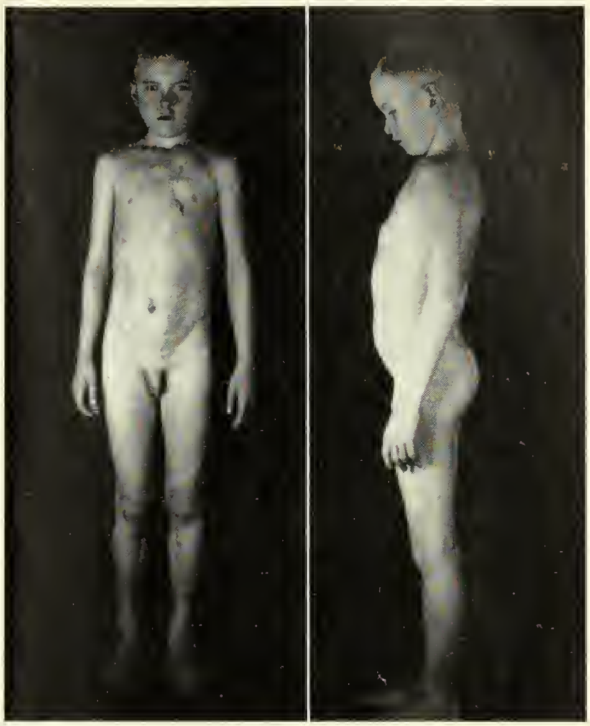

Fig. 2. Shows patient five months after operation. No edema or ascites present.

Discussion

The foregoing report indicates indisputably that the ability of this patient to fabricate serum proteins was markedly impaired as a result of the interference with his hepatic circulation. While loss of protein in the ascitic fluid, during the time of his last admission to the hospital, was not insignificant, this fact would not apply as an important contributing cause of the persistent hypoproteinemia during his first admission to the University Hospital. During that time he was maintained on a dietary regimen which provided a strongly positive nitrogen balance over a period of six months without loss of protein by way of the urine or by removal of ascitic fluid. That chronic passive congestion of the liver and cellular changes associated therewith (resulting from the constrictive pericarditis) were directly responsible for the failure of serum protein regeneration is rendered almost certain by the fact that the latter function was finally restored, after the congestion had been relieved by pericardiolysis.

While the subcutaneous edema, as well as the ascites and hydrothorax, was undoubtedly dependent to some extent upon the high venous pressure (increased filtration pressure), the hypoproteinemia appeared to play the more important role in edema formation. Edema disappeared after the serum protein levels had been restored to normal postoperatively, even while the venous pressure was still elevated far above normal.

The general body protein metabolism and the formation of hemoglobin appear to have suffered very little, if at all, in this case and in that of Stadler and Stinger[7] as a result of the disturbance in the serum-protein-producing function. Much of the transfused protein may have entered into the general body protein metabolism, since Madden and Whipple[9] have shown that there is a dynamic exchange or equilibrium between serum proteins and general body proteins.

While it is undoubtedly true that certain types of liver injury (such as that presumed to be present in the case described here and in those referred to above) interfere with serum protein production, the occurrence of much more extensive liver destruction in other cases[10] without significant decrease in the level of serum protein presents a perplexing question for future investigation. Extrahepatic factors may possibly play an accessory role under certain conditions. A severe disruption of the processes involved in the regeneration of serum proteins as recorded here without measureable impairment of other hepatic function at the same time emphasizes again the high degree of specificity in the liver's multiple functions.

Summary and Conclusions

A case of chronic constrictive pericarditis with secondary congestive hepatic disease, ascites, and edema (Pick's syndrome) was investigated to determine the cause of an associated hypoproteinemia of severe grade. Although there was no significant loss of protein by way of the ascitic fluid over a period of many months and never any by way of the urine, both the albumin and the globulin of the serum remained at subnormal levels in spite of a strongly positive nitrogen balance. The conclusion drawn from this observation was that the patient was unable to fabricate serum proteins in a normal manner from the amino acids derived from his diet. This functional incapacity was attributed directly to the liver injury resulting from severe passive congestion. When the latter was relieved by pericardiolysis, the serum proteins returned to normal for the first time in four years and edema disappeared completely.

References

1. Thompson, W. H., Ziegler, M. R., and McQuarrie, Irvine: Am. J. Dis. Child. 44:650, 1932.
2. Thompson, W. H., McQuarrie, Irvine, and Bell, E. T.: J. Pediat. 9:604, 1936.
3. Myers, W. K., and Taylor, F. H. L.: J.A.M.A. 101:198, 1933.
4. Gilbert, A., and Cheray, M.: Mem. Soc. de biol. 63:487, 1907.
5. Salvesen, H. A.: Acta med. Scandinav. 72:113, 1929.
6. Peters, J. P., and Eisenman, A. J.: Am. J. M. Sc. 186:808, 1933.
7. Myers, W. K., and Keefer, C. S.: Arch. Int. Med. 55:349, 1935.
8. Stadler, H., and Stinger, D.: J. Pediat. 18:84, 1941.
9. Madden, S. C., and Whipple, G. H.: Physiol. Rev. 20:194, 1940.
10. Hansen, A. E., Ziegler, M. R., and McQuarrie, Irvine: J. Pediat. 17:9, 1940.

Book Reviews

Synopsis of Genitourinary Diseases, by Austin I. Dodson, Professor of Genitourinary Surgery, Medical College of Virginia; 3rd edition, 302 pages and 112 illustrations; St. Louis: C. V. Mosby Co., 1941.

- - - - - - -

This third edition of Dr. Dodson's book maintains its usual clear, concise form and summarizes all types of genitourinary disorders. It has been brought up to date by addition of sections on sulfonamide therapy in urology, and includes all of the useful newer drugs. The section on pathogenesis and treatment of urinary calculi is a comprehensive summary of present day knowledge of this subject. The book should be valuable to the student and practitioner, and can be especially recommended for the purpose of giving information to the more intelligent patient. The numerous explanatory drawings serve to simplify the complexities of urinary tract disease.

Roentgen Treatment of Infections, by James F. Kelly, M.D., Professor and Director of the Department of Radiology, Creighton University School of Medicine, and D. Arnold Dowell, M.D., Assistant Professor of Radiology, Creighton University School of Medicine; Chicago: The Year Book Publishers, Inc.., 1942; 432 pages, illustrated. $6.00.

- - - - - - -

About 100 pages of this book are taken up with a discussion of X-ray physics and history and fundamentals of therapy, especially with the mobile apparatus. Over another 100 pages contain a discussion of the history, classification, treatment and prophylaxis of gas-gangrene. Some over 400 cases have been collected by the authors who feel confident that low voltage X-ray therapy is the treatment of choice and that its early use will lower the mortality rate to around 10 per cent for post-traumatic cases. Some very positive statements regarding the value of serum, sulfanilamid and its early derivatives in conjunction with X-ray therapy and surgical procedures (debridement, amputation) are to be found. Serum is considered nonessential; sulfanilamid and its early derivatives detrimental, and debridement or amputation in the early stages are looked upon as not only unnecessary but detrimental.

Acute abdominal conditions, chiefly peritonitis and their response to X-ray therapy take up slightly less than 100 pages. Case reports, wherein the response has been favorable, constitute the main portion of the written material. Brief mention is then made of the use of X-ray therapy in various superficial infections, parotitis and mastoditis and lastly pneumonia. Numerous case reports with illustrations are again used. The final chapter is a short review of contraindications to X-ray therapy, with again case reports being used freely.

The main emphasis of the text as a whole seems to be on the role of X-ray therapy in gas-gangrene infections. An unusual degree of enthusiasm for this method of therapy is repeatedly emphasized. The possibility of an etiologic relationship between gas-bacillus infection and acute spreading peritonitis forms the theoretical basis for favorable results in X-ray therapy for peritonitis following appendicitis, intestinal obstruction or peritoneal contamination with intestinal organisms. The written material concerning other infections is meagre and therefore the title of the text is somewhat misleading. A thorough survey of roentgen treatment of infections, in general, as might be expected, is not presented.

The 1941 Year Book of Neurology, Psychiatry and Endocrinology, by Reese, Lewis, and Sevringhaus; Chicago: The Year Book Publishers; 768 pages.

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This 1941 Year Book continues to present a most thorough, up to date review of the literature in these three branches of medicine. The choice of articles is excellent both from a scientific and practical point of view. A very definite attempt is made to present in a critical manner the many newer therapeutic procedures in order to make them more generally available. Many foreign articles are included this year. These are of particular interest and especially valuable since such literature has become almost inaccessible in this country during the past year. An excellent section has been added on military psychiatry.

The articles in this section on military psychiatry have been well chosen and should prove of utmost value and interest particularly in view of the many new psychiatric problems that confront the physician, not only in the army but also in the civilian population. The newer methods of warfare, especially aerial, have brought much larger numbers of individuals in close contact with the actual results of conflict.

The
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MINNEAPOLIS, MINN., MAY, 1942

THE IMPORTANCE OF CHILD HEALTH

During recent years the May issue of JOURNAL-LANCET has been devoted primarily to original contributions dealing with the problems of health and disease in infancy and childhood. This editorial practice has become more or less traditional because of encouragement from our regular readers and from prominent physicians in all parts of America. Since May Day has been officially designated as Child Health Day by proclamation of the President of the United States under authorization from Congress, May is obviously the most appropriate month of the year for stressing the importance of this subject by medical journals, members of organized medical groups, public health authorities, and other health agencies.

The variety of titles included in the list of manuscripts offered for this current number of the JOURNAL illustrates the varied nature of the clinical problems which continuously confront the physician dealing with sick children. While progress in our knowledge concerning the etiology, prophylaxis, and treatment of many diseases of infancy and childhood has increased at an amazing rate during recent years, many perplexing problems still remain unsolved. So long as these are with us, any contribution toward their solution will be welcomed by the medical profession. When we pause for a moment to trace the steps by which our knowledge of the diseases of infancy and childhood has been acquired and to recall the progress made during the past quarter of a century in devising methods of prophylaxis and treatment for many disease states, we gratefully recognize the ever-increasing part played by carefully planned scientific research.

Child health has been benefitted materially by nearly every great medical discovery made in recent years. This applies in particular to advances in the fields of nutrition, endocrine physiology, and chemotherapy, as illustrated by some of the clinical reports presented in the present issue. Improvements in surgery of the heart and lungs has made possible the cure of some heretofore hopeless disorders.

While all of our newer knowledge should be applied in connection with the national program for conserving child health, there should be no slackening of our effort to stamp out the more important and more serious epidemic diseases. The Child Health Day proclamations of the President and of our state governors lay special stress this year on the importance of immunization against small pox and diphtheria, not without sound reason. The people at large and many physicians have become dangerously lax in their attitude toward these preventable diseases. Unless our public health authorities and the far sighted representatives of our organized medical groups are successful in their efforts to extend the benefits of vaccination and other prophylactic measures, we can expect serious outbreaks of epidemic diseases. Experience has demonstrated that epidemics are particularly prone to occur in war time. Since the strength of a nation engaged in all-out war has been shown to be as much dependent upon the health of its citizens, including its children, as upon armaments and raw materials, the best strategy calls for a vigorous campaign to put into practice without delay every principle known regarding conservation of health.

I. McQ.

CHILD BEHAVIORISM

"Suffer little children to come unto me and forbid them not for of such is the Kingdom of heaven." Can anyone conceive of a more appropriate inscription to adorn the wall of a pediatrician's office?

Children may be very trying when sick, but aren't we all! We recall the oft repeated expression of a professor of pediatrics, in the long ago, who used to start his examination of "the little sufferer" with the statement "a crying child is not well." It became such a truism to the members of his class that there was danger of establishing the converse, tending to an implication that a child who did not cry was not ill.

It is becoming more and more recognized that adult associates are to blame for much of the crying and irritability of children both in sickness and in health. In children's wards we rarely see tantrums and tears. There is usually a serenity on the part of these little patients when left to themselves that is unbelievable perhaps, and surely incomprehensible to those well intentioned visitors whose solicitations upset the emotions and interrupt the restful calm. When selecting an inscription for a children's hospital, how would it be to have something like this on a remote wall where sentimental adults might see it only on special occasions and when in a mood not to take offense, "We have no enemies, but came here to escape from our friends."

"*Are You Training Your Child to Be Happy?*" is the title of one of the bulletins published by the Children's Bureau in Washington, D. C., and we suspect that many parents might read it for the good of themselves and the children of present and future generations. Behaviorism comes of very small seed. A. E. H.

MALARIA AND MALTHUS

Malaria, the most widespread serious disease there is, has afflicted one-third of the world's population. In its malignant form malaria has wiped out whole communities. In India it is estimated that about a hundred million people are infected with the plasmodium and that about two million deaths per annum there are directly due to malaria. In the Ceylon epidemic of 1934-35 there were 80,000 deaths among two or three million cases. It has played an interesting part in history. The Bible tells us (II Kings, xx:35-36) that "it came to pass that night, that the angel of the Lord went out, and smote in the camp of the Assyrians an hundred fourscore and five thousand; and when they arose early in the morning, behold, they were all dead corpses. So Sennacherib, king of Assyria, departed, and went and returned, and dwelt at Nineveh." Allenby did the same thing, unwittingly of course, in World War I, camping his men in approximately the same region, where malignant malaria and the same breed of mosquitoes had existed for ages. When his men began to sicken and die, without apparent cause, he remembered the experience of Sennacherib and moved out, but more promptly, so that his command soon regained its health and took Jerusalem without firing a shot.

One would think that with our present knowledge of the value of quinine, atabrine, et cetera, in the prophylaxis and cure of malaria it would merely be a matter of procurement and organization to eliminate this scourge from the face of the earth. But a modern writer (F. M. Burnet, M.D., Assistant Director, Walter and Eliza Hall Institute, Melbourne, Australia: "Biological Aspects of Infectious Disease," The Macmillan Company, New York, 1940) thinks such a wide-scale therapy would be unwise. Here is what he says: "The influence of the disease extends far beyond its obvious activities as a cause of death and serious illness. It is the great devitalizer of the tropics—much of the backwardness of the Indian peasant has been ascribed to malaria—and it is the main agent of infantile mortality. If malaria could be suddenly eliminated from the globe, the racial, economic and political consequences within a few years would probably be appalling. India and parts of Africa are populated up to and beyond the capacity of the land to provide adequate food by present methods, and even with the tremendous infantile and prenatal mortality caused by malaria, the populations are increasing steadily. The sudden conversion to a more vigorous and *rapidly* increasing population would undoubtedly produce famine, immigration and intense internal and external repercussions."

This is something to think about. Malthus, from a different approach, tried to put the same idea across 150 years ago, but was derided and thoroughly discredited. Today his views are accepted by thinking people and are enormously important in the light of present developments. It seems to this writer that ideas of Burnet as expressed in the quotation from his book fit beautifully into the now widely accepted Malthusian doctrine.

G. C.

Future Meetings

NORTH DAKOTA STATE MEDICAL ASSOCIATION

1942 Meeting

Jamestown, May 18-20

The North Dakota State Medical Asociation annual meeting will be held in Jamestown May 18, 19 and 20. The House of Delegates and the State Health Officers Association will meet on Monday, May 18. The scientific sessions of the State Association will be held on Tuesday and Wednesday, May 19 and 20. The program has not been completed but will include the following features:

Obstetrics—by Dr. Ralph Reis, Chicago.

Pediatrics—by Dr. Erling Platou, Minneapolis.

Fractures—by Dr. Stanley, Maxeiner, Minneapolis.

Symposium on Nervous and Mental Diseases at the State Hospital, to be conducted by Dr. Gordon Kamman, St. Paul.

Symposium on Encephalitis in which Drs. Rosenow of Rochester, Minnesota, and Herald R. Cox, U. S. Public Health Service Laboratory, Hamilton, Montana, will participate.

Glaucoma—by Dr. G. M. Constans, Bismarck.

"The Symptom of Headache"—by Professor Boies, University of Minnesota.

"The Role of the General Practitioner and the Solution of the Problem of Gastric Carcinoma"—speaker to be announced later.

Several luncheon discussions are planned for Tuesday and Wednesday. The North Dakota Academy of Ophthalmology and Otolaryngology will meet on Tuesday, May 19.

MONTANA STATE MEDICAL ASSOCIATION

PROGRAM, 64TH ANNUAL MEETING

Missoula, July 8, 9, 10, 1942

Wednesday, July 8

8 to 10 A. M.—Meeting of House of Delegates.

10 A. M.—Call to order, etc.

10:30 A. M.—President's address.

11 A. M.—Address by Dr. Morris Fishbein, editor, *Journal of the American Medical Association.*

12 Noon—Meeting of presidents of county societies. Meeting of secretaries of county societies.

2 P. M.—"Headache"—Dr. R. L. Boies, University of Minnesota.

3 P. M.—"Pathology of Silicosis and Silico-Tuberculosis"—Dr. G. J. McHeffey, Billings, Montana.

4 P. M.—"Clinical Aspects of Silicosis and Silico-Tuberculosis"—Dr. Frank I. Terrill, Deer Lodge, Montana.

7:30 P. M.—Entertainment by Western Montana Medical Society.

Thursday, July 9

8 to 10 A. M.—Meeting of House of Delegates.

10 A. M.—Film "Proctoscopic Color Photography"—Dr. Jay M. Garner and Dr. J. Peerman Nesselrod.

11 A. M.—"Fundamental and Clinical Considerations in Intestinal Obstructions"—Dr. H. K. Ransom, University of Michigan.

12 Noon—Panel Discussions: Room A—Dr. J. P. Nesselrod: "Diseases of Rectum"; Room B—Dr. H. K. Ransom: "Management of Perforated Appendix"; Room C—Dr. N. F. Miller: "Pelvic Disease in the Female."

2 P. M.—"The Human Cervix in Health and Disease"—Film by Dr. Norman F. Miller, University of Michigan.

3 P. M.—"Coronary Thrombosis: Discussion of Some of the Errors in Diagnosis"—Dr. Cyrus C. Sturgis, University of Michigan.

4 P. M.—"Fortification and Enrichment of Foods, and Nutritional Significance of the Vitamins"—Dr. Howard B. Lewis, University of Michigan.

6:30 P. M.—Banquet. Dr. Morris Fishbein, principal speaker.

Friday, July 10

8 to 10 A. M.—Meeting of House of Delegates.

10 A. M.—"Is Rectal Cancer Preventable?"—Dr. J. P. Nesselrod, Northwestern University.

11 A. M.—"Recent Studies in Metabolism of Proteins Which are of Clinical Significance"—Dr. H. B. Lewis.

12 Noon—Panel Discussions: Room A—Dr. Cyrus C. Sturgis: "Diseases of the Blood"; Room B—Dr. H. B. Lewis: "Vitamins".

2 P. M.—"Surgery of the Ovary"—Dr. Norman F. Miller.

3 P. M.—"Menace and Treatment of Obesity"—Dr. Cyrus C. Sturgis.

4 P. M.—"The Diagnosis and Management of Disease of the Biliary Tract"—Dr. Henry K. Ransom.

Motion picture films will be shown daily in the general meeting room at 9 A. M.

Necrology

Dr. H. M. Blegen, 56, of Warren, Minnesota (formerly a resident of Minneapolis), died March 26, 1942, in the University Hospital at Minneapolis.

Dr. Blegen was born in Rochester, Minnesota. He was graduated from Augsburg college in 1904 and received his M.D. degree from the University of Minnesota in 1909. From 1910 to 1912 he was city physician for Minneapolis and since 1916 had been practicing in Warren.

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*** J. A. M. A., 93:1110 — October 12, 1929**
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****The Military Surgeon, Vol. 89, No. 1, p. 7, July, 1941**

SEND FOR REPRINT of an important contribution to medical literature—"The Cigarette, The Soldier, and The Physician," *The Military Surgeon,* July, 1941. This significant analysis reveals many new angles about smoking that should be valuable to you when modifying patients' smoking without disturbing their smoking enjoyment. Write to Camel Cigarettes, Medical Relations Division, 1 Pershing Square, New York City.

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News Items

Woman's Medical Auxiliary to the South Dakota State Medical Association

The spring advisory board meeting of the woman's auxiliary to the South Dakota State Medical association was held Saturday at the home of the state president, Mrs. F. C. Nilsson.

Members who attended were the president-elect, Mrs. B. M. Hart, Onida, who announced she will not be able to assume the presidency next year, owing to her family's moving to California; Mrs. O. L. Hanson, Valley Springs; Mrs. G. E. Burman, Carthage; Mrs. B. A. Bobb, Mitchell; Mrs. P. R. Billingsley, Mrs. G. S. Adams, Yankton; Mrs. D. S. Baughman, Madison, all of whom are officers and chairmen of the state auxiliary; Mrs. Anton Hyden, president of the woman's auxiliary to the Seventh District Medical society; Mrs. N. J. Nessa, Mrs. T. J. Billion, both of whom are former state presidents; and Mrs. E. S. Stenberg, program and publicity chairman, and a former president of the seventh district.

From the reports given, members learned that despite war conditions the auxiliary has made material progress, reporting a gain in membership alone of approximately 20 per cent.

Dr. Donald A. McCannel who recently completed a three-year fellowship at the Mayo Clinic, Rochester, is now associated with Dr. Thomas Moore, Memphis, Tennessee, urologist. Dr. McCannel is the son of Dr. A. D. McCannel, Minot, North Dakota.

Dr. J. E. Murphy, Coleraine, Minnesota, has joined Dr. W. W. Yaeger in Marshall, Minnesota, in the practice of general medicine. Dr. Murphy was graduated from the University of Minnesota Medical School in 1940 and for the past 18 months served his internship at Minneapolis General hospital.

Dr. J. L. O'Rourke, Anaconda, Montana, has succeeded Dr. Gordon Anderson, Deer Lodge, as president of the Mount Powell Medical society.

Dr. Lee Roy McBurney, Great Falls, Montana, has been named county physician to succeed Dr. Robert J. McGregor.

Dr. Philip G. Hoeper, eye, ear, nose and throat specialist who recently completed three years of study at Columbia university's New York postgraduate medical school and hospital, has joined the staff of Mankato clinic. He practiced medicine at Brooten, Minnesota and Litchfield, and for several years at Williston, North Dakota, preceding his postgraduate study in New York City.

Dr. H. J. Bartron, Watertown, South Dakota, has been elected to an active fellowship in the International College of Surgeons.

ANNUAL JOURNAL-LANCET LECTURE — UNIVERSITY OF MINNESOTA MEDICAL SCHOOL

Dr. Herald R. Cox, Principal Bacteriologist in the National Institute of Health of the United States Public Health Service will deliver the second annual Journal-Lancet lecture at the University of Minnesota Medical School on Friday, May 22.

The title of his lecture will be "Typhus Fever: with Special Reference to Epidemiology and Immunity." The lecture will be held at 8 p. m. in the Medical Sciences Amphitheatre, Room 15.

Dr. Cox holds the Doctor of Science degree from Johns Hopkins University where he was also instructor in immunology for one year. Thereafter he was an investigator in bacteriology and pathology in the Rockefeller Institute until 1936. Since that time he has worked with the United States Public Health Service. His work has been confined largely to the filterable virus and related diseases including especially equine encephalomyelitis, Rocky Mountain spotted fever and typhus.

All physicians are invited to attend the lecture.

Dr. O. M. Moore, former resident pediatrician at the Minneapolis General hospital, has joined the staff of the Northwest clinic in Helena, Montana. Other members of the clinic are Drs. T. L. Hawkins, R. Wynne Morris, and E. H. Lindstrom.

Dr. Frederick A. Smith, Rochester, Minnesota, has been promoted from First Lieutenant to Captain in the U. S. Army Medical Corps. He is stationed at Lowell General hospital, Fort Bevans, Massachusetts.

Dr. Wesley W. Spink, who has pioneered in studies of sulfanilamide at the University of Minnesota, was recently named to a fellowship in the American College of Physicians for "outstanding work in the field of internal medicine."

Dr. E. L. Serderlin, Fargo city health officer, has returned from Mississippi where he had been for a month's assignment from the North Dakota health department aiding in the Mississippi sanitation program.

Dr. James H. Lyons, Beach, North Dakota, has been commissioned to the surgical staff of the Great Lakes Naval Training station near Chicago.

Dr. D. J. Ryan, formerly of Fairfax, has become associated with Dr. C. J. Henry in Milaca, Minnesota.

Dr. Wallace E. Anderson, formerly of Thief River Falls, has been promoted from first lieutenant to captain in the medical corps, United States Army. He is an instructor in the officer candidate school at Carlisle Barracks, Pennsylvania.

The
JOURNAL
LANCET

Minneapolis, Minnesota
June, 1942

Vol. LXII, No. 6
New Series

Staphylococcic Ocular Inflammation[*]

James H. Allen, M.D.
Iowa City, Iowa

THE staphylococcus is one of the most frequent causes of ocular inflammation. General recognition of this fact has been delayed because saprophytic staphylococci are normal inhabitants of the conjunctiva and skin and, therefore, it has been assumed that staphylococci isolated from ocular inflammatory processes have been secondary invaders. However, strains of this organism isolated from ocular inflammations have been proven capable of producing a powerful exotoxin.[1] Application of this exotoxin to the conjunctiva of laboratory animals and human volunteers has resulted in the production of conjunctivitis and keratitis[1] and conjunctivitis has been reproduced experimentally with the organisms.[2]

Staphylococci are Gram-positive spherical organisms averaging 0.8 to 1 micron in diameter and tend to cluster together in masses like a bunch of grapes. However, in smears from the conjunctiva, they occur singly or in pairs more often than in clumps. These organisms grow well on the usual laboratory media producing colonies 2 to 4 mm. in diameter in forty-eight hours. The colonies are convex and round with sharply defined regular borders. The non-pathogenic varieties found upon the normal conjunctiva and skin produce opaque glistening white or grayish-white colonies but do not cause hemolysis on blood agar plates and do not produce an exotoxin. The pathogenic varieties usually produce yellow colonies, cause hemolysis on blood agar, and produce exotoxin. Occasionally organisms forming white colonies cause hemolysis, produce exotoxin, and are pathogenic. The pathogenic varieties usually coagulate citrated human and rabbit serum, ferment mannitol, and produce yellow or purple colonies on crystal violet agar.

In practice it is impossible to employ all of these tests but a fairly accurate determination of pathogenicity may be made by observing growth and reaction upon blood agar plates and phenol-red-mannitol-agar plates. The latter medium contains 1 per cent mannitol in agar with phenol-red as an indicator. Pathogenic staphylococci ferment mannitol producing acid and causing the media around the colony to change from red to yellow.

The most frequent and least recognized ocular inflammation produced by staphylococci is conjunctivitis.[3]

Acute staphylococcic conjunctivitis occurs most frequently in the infant causing approximately 50 per cent of ophthalmia of the newborn. It may begin anytime after birth with an acute onset characterized by edema of the lids, and a profuse purulent discharge. The conjunctiva may be chemotic, severely inflamed, and occasionally the lower palpebral conjunctiva may be covered by a loose pseudomembrane. Fortunately the condition is self limited and subsides within 7 to 10 days. A similar acute self limited staphylococcic conjunctivitis is seen rarely in the adult.

Chronic staphylococcic conjunctivitis occurs at any age but most frequently in adults and constitutes approximately one-third of chronic conjunctivitis. The disease extends over several months or years with alternating periods of acute or subacute exacerbations and remissions.

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[*] From the department of ophthalmology, College of Medicine, State University of Iowa, Iowa City, Iowa; part of a study being conducted under a grant from the John and Mary R. Markle Foundation. Read before the South Dakota Academy of Ophthalmology and Otolaryngology, Mitchell, South Dakota, May 19, 1941.

In an acute exacerbation, the patient complains of redness and congestion of the eyes and lid margins, blurring of vision, scratching sensation, burning of the eyes, photophobia, lacrimation, blepharospasm, slight discharge, crusting of the lid margins, and an inability to use the eyes for any length of time.

The lid margins appear red, scaly, and thickened as in other types of blepharoconjunctivitis. Oftentimes there are excoriations, covered with crusts and scales, along the lid margins and occasionally excoriations in the region of the canthi. The meibomian glands, especially those in the lower lid, are infected and on expression yield a yellow mucopurulent material. In severe infections, the lids may be edematous and ectropion may develop as a result of thickening of the conjunctiva of the lower lid and fornix. Unusually severe exacerbations may be accompanied, in the region of the lid and cheeks, by a dermatitis characterized by small papular lesions arising from a reddened skin which near the lower lid margin becomes increasingly red, thin, moist, and especially susceptible to excoriation and maceration. In other cases, the ocular lesions may be accompanied by acne vulgaris, impetigo of the face or by sycosis vulgaris in the region of the beard and scalp.

Redness and thickening of the conjunctiva always is most pronounced in the lower lid and fornix; the papillary hypertrophy in the fornix gives to the conjunctiva a corrugated appearance. Follicles are rare. Almost pathognomonic are the congestion and thickening of the caruncle and semilunar fold. In contrast, the conjunctiva of the upper lid and fornix shows slight inflammatory changes. The bulbar conjunctiva is congested but there is no chemosis. While lacrimation is pronounced, the discharge from the conjunctiva is strikingly scanty for the severity of the inflammation. Occasionally thick yellow discharge occurs and in rare cases pseudomembranes may form on the palpebral conjunctiva. Punctate subconjunctival hemorrhages are encountered only in the more severe infections.

A punctate epithelial keratitis is observed in all cases at one time or another, during an acute attack. Observation with the biomicroscope reveals multiple minute, punctate, gray areas which stain with fluorescein in the superficial layers of the corneal epithelium. These opacities usually are more numerous in the lower portion of the cornea; frequently they are situated in the periphery but may be distributed over the pupillary area or in other parts of the cornea. In addition to the epithelial disturbances, marginal ulcers may form in severe cases which, after healing, leave a pannus similar to that encountered in old rosacea keratitis. Circumcorneal congestion is usually present during the acute stage of inflammation, and a few cells, indicative of mild iris irritation, may be seen in the anterior chamber.

In the subacute stage, the symptoms and signs are of a similar nature but less severe. Ordinarily the cornea is unaffected at this time, and as a consequence, there are fewer complaints. However, the redness and thickening of the lower palpebral conjunctiva and fornix, congestion and swelling of the caruncle, redness and thickening of the lid margins, and infection of the meibomian glands are still much in evidence.

In the chronic stage, the subjective symptoms may be almost negligible; the lid margins are somewhat red and scaly, there is a slight discharge which is most noticeable upon awakening in the morning, and the patient complains of inability to use the eyes over extended periods. Examination reveals the redness and thickening of the conjunctiva of the lower lid and inferior cul-de-sac along with similar changes in the caruncle and semi-lunar fold, marginal blepharitis, and infection in the meibomian glands. As a rule, the conjunctiva of the upper lid and fornix and that of the eyeball appear almost normal. The cornea shows no pathology during this stage.

In addition to conjunctivitis staphylococci frequently are the cause of a number of other inflammatory lesions in and about the eye. These are: hordeolum, acute chalazion, blepharitis, lid abscess, orbital abscess, postoperative or posttraumatic intraocular infection, and cavernous sinus thrombosis.

In order to simplify the discussion, we may divide the treatment of staphylococcus infection into three groups, i. e., immunization therapy, chemotherapy, and surgical therapy.

IMMUNIZATION THERAPY

Immunization therapy consists of the administration of antitoxin, toxoid, and vaccine.

In ophthalmic practice, antitoxin rarely is indicated, but may be of value in cavernous sinus thrombosis, orbital abscess, intraocular infection and in severe acute exacerbations of conjunctivitis accompanied by corneal ulceration. In the latter condition, 10,000 units of antitoxin injected intramuscularly each day for four days is usually sufficient to control the ulceration. Improvement is noticed on the third or fourth day of this treatment, and the corneal lesion usually is healed in seven to ten days after institution of therapy. A simultaneous improvement in the associated conjunctivitis is observed. However, this improvement is temporary; exacerbations of both the conjunctivitis and corneal complications are likely to occur unless active immunization with toxoid is instituted.

In cavernous sinus thrombosis, orbital abscess, and intraocular infections due to staphylococci, 10,000 units or more of antitoxin may be given intramuscularly or intravenously each day, depending upon the severity of the disease.

Patients should be tested for sensitivity to horse serum before staphylococcus antitoxin is given.

Toxoid therapy has the widest ophthalmic application of the three immunizing agents. Toxoid stimulates an active or lasting immunity against toxin produced by the organisms. In spite of the fact that immunity is not established against the bacteria, this method of treatment is effective in many patients suffering from staphylococcus infection, probably because the greater portion of the inflammation is caused by the toxin. Therefore, the individual actively immunized against toxin is capable of neutralizing this material as rapidly as it is produced by the organism thus preventing or controlling many of the inflammatory symptoms and giving enough support to the defense mechanisms of the host to enable him to overcome the infection.

Toxoid is prepared by denaturing toxin in such a manner that its toxic activity is destroyed but its ability to stimulate the production of antitoxin is retained. It is prepared and supplied in two concentrations. Dilution No. 2 or second strength toxoid is ten times as concentrated as dilution No. 1 or first strength toxoid. Various methods of administering this material have been advocated but we have had best results by giving a series of subcutaneous injections, as illustrated in the following schedule:

January	1	0.1 cc.	1st	strength
”	5	0.2 ”	”	”
”	9	0.3 ”	”	”
”	13	0.4 ”	”	”
”	17	0.5 ”	”	”
”	21	0.6 ”	”	”
”	25	0.7 ”	”	”
”	29	0.8 ”	”	”
February	2	0.9 ”	”	”
	(4 day interval)			
February	6	0.1 cc.	2nd	strength
”	10	0.2 ”	”	”
”	14	0.3 ”	”	”
”	18	0.4 ”	”	”
”	22	0.5 ”	”	”
”	26	0.6 ”	”	”
March	2	0.7 ”	”	”
”	6	0.8 ”	”	”
”	10	0.9 ”	”	”
”	14	1.0 ”	”	”
”	21	1.0 ”	”	”
”	28	1.0 ”	”	”
	(7 day interval)			
April	4	1.0 cc.	2nd	strength
”	11	1.0 ”	”	”
”	18	1.0 ”	”	”

This course of treatment usually has resulted in the production of from 4 to 17 units of antitoxin per cc. of serum and this level has been sufficient to control the disease. Occasionally the titre has been less than 4 units per cc. of serum and these patients had recurrences of the infection. Further injections of toxoid did not increase the titre nor prevent recurrences. In this group, supplementary chemotherapy was necessary.

There are two precautions one must remember in the use of staphylococcus toxoid therapy: (1) The initial injection of toxoid may cause a focal reaction, i. e., a temporary exacerbation of the inflammatory process; therefore, in the rare cases of severe infection and in conjunctivitis with corneal complications, it is better to delay toxoid therapy until improvement has been obtained by passive immunization with antitoxin. (2) Occasionally an individual may develop a reaction consisting of headache, backache, muscle pains, joint pains and malaise within a few hours after the injection of toxoid. This, probably, is a reaction to some constituent of the medium in which the toxoid is prepared, and can be prevented by beginning the course of treatment with smaller amounts of toxoid and gradually increasing the subsequent doses until the series of injections outlined above may be given. The individual who is likely to develop this general reaction may be determined by injecting the first dose (0.1 cc. of 1st strength toxoid) intracutaneously. If with this test dose less than 2 cm. of redness develops within forty-eight hours after the injection, the patient will not develop untoward focal or general reactions to subcutaneous injections of first strength toxoid and the above series of treatments may be given. However, if at the end of forty-eight hours the test dose results in more than 2 cm. of redness or induration around the site of injection, the patient must be given smaller subcutaneous injections of toxoid. In this case, a series of nine injections of a 1 to 10 dilution of first strength toxoid is given beginning with 0.1 cc. as the first dose and increasing the injection by 0.1 cc. on each succeeding injection. This is followed by the course of treatments with first and second strength toxoid.

Recently a third type of toxoid has been made available under the name "staphylococcus toxoid—digest modified." This is ten times as concentrated as second strength toxoid but has been prepared in a manner which eliminates the substances causing the general reaction. Therefore, it can be injected without a preliminary intracutaneous test injection. A series of treatments with this type of toxoid would consist of 15 injections and corresponds to the series of treatments with second strength toxoid illustrated above.

Vaccine is prepared by suspending killed staphylococci in normal saline. The organisms are grown in broth, concentrated by centrifugation, washed and suspended in saline and killed by incubation in a water bath at 60° C. for one hour on three successive days. Cultures are made in order to be certain that the organisms have been killed and then the suspension is diluted with saline to obtain the approximate concentration of organisms desired (usually 900,000 per cc.). The vaccine may be prepared from a stock strain of staphylococci or from organisms cultured directly from the patient. The usual vaccine is prepared from organisms which have been grown in broth for eighteen to twenty-four hours; however, recent work would seem to indicate that better results may be obtained by using organisms incubated in broth for only three hours. Vaccine prepared by either method may be given in ascending doses at weekly intervals beginning with 0.1 cc. and increasing each dose by 0.1 cc. until a dosage of 1.0 cc. has been reached.

Immunization developed by the administration of vaccine is active or lasting and is effective against the bacteria, but does not counteract toxin produced by the organisms.

Summarizing staphylococcus immunization therapy, then, antitoxin produces a transient or passive immunity to toxin but has no effect on the organisms; toxoid produces a lasting or active immunity to toxin but has no effect on the organisms; and vaccine produces a lasting or active antibacterial immunity but does not protect against toxin. Thus, antitoxin is indicated in severe infections caused by organisms producing toxin, or more specifically in cases with toxemia, severe intraocular infections and in cases of corneal ulcer in which the institution of active immunization might cause an exacerbation of the disease. However, antitoxin therapy is temporary and must be followed by active immunization or accompanied by chemotherapy. Since staphylococcus antitoxin is prepared in horse serum, it is contraindicated in patients who are sensitive to that medium.

Toxoid is indicated in those infections with intense inflammatory manifestations in which a temporary exacerbation is not likely to prove dangerous and as supplementary therapy following antitoxin administration.

Vaccine therapy is indicated in those cases of repeated localized infections with inflammation closely limited to the site of infection and as a supplement to toxoid therapy.

CHEMOTHERAPY

While active immunization therapy is specific and may result in permanent freedom from infection, there are certain individuals in whom the administration of toxoid and vaccine is an inadequate stimulus for the production of immunity; and therefore, they remain susceptible to infection. In these individuals, other forms of treatment must be used. Also, additional therapeutic agents are useful in patients with severe infections.

Sulfathiazole has proven to be of value in the treatment of staphylococcic infections. It may be given by mouth or applied locally. Oral administration of the drug seems to be more valuable in deep infections as in abscesses and bacteremia, whereas local application seems to give best results in superficial infections such as conjunctivitis.

In the adult, 0.5 to 1.0 gram of sulfathiazole may be administered by mouth four to six times in twenty-four hours. In severe infection in which a rapid maximum blood concentration of the drug is desired, an initial dose of 4 grams may be given, then followed by the usual four or six hour dosage.

In the infant or child weighing less than 25 kg., the total daily dose may be figured at 0.15 gram per kilogram of body weight. This should be divided into four equal parts, one part to be administered every six hours. In severe infections, the calculated total daily dose may be given initially and followed by the smaller dose every six hours.

The drug may be continued until the temperature has remained normal for three days but usually seven to ten days is sufficient in ophthalmic practice.

There are a number of factors to be kept in mind in the administration of sulfathiazole by mouth. Fluids should be given in sufficient quantity to keep the output of urine above 1000 cc. per day, and anesthetic doses of barbiturates should be avoided. The patient should be kept under close observation for the development of toxic manifestations, the more common being fever, rash and episcleritis with or without conjunctivitis. The fever usually develops between the fifth and ninth day of therapy. Rash usually develops between the fifth and ninth day; it may be of any type but the nodular variety seems to be the more common. Episcleritis, which may or may not be associated with conjunctivitis and swelling of the lids, has been reported in approximately 4 per cent of several series of cases treated with sulfathiazole. Other less common toxic manifestations are: hematuria, leukopenia, anuria, nausea, vomiting, cyanosis, painful joints, psychoses, hepatitis, and jaundice.

It is wise to ask a patient if he has previously had a toxic reaction to one of the sulfonamide drugs, for a second toxic reaction usually is more severe and develops sooner than the first. A small test dose may be tried if there is doubt.

Local administration does not build up the blood concentration of the drug to very high levels and therefore, toxic reactions are less likely to occur. In conjunctival lesions, the drug may be applied in an ophthalmic ointment base in 5 per cent concentration several times a day. This apparently has been effective in several cases of acute and chronic staphylococcic conjunctivitis.

The drug also may be applied in the powder form in the conjunctiva, following the drainage of abscesses and in infected wounds.

Sulfanilamide apparently has little effect upon staphylococcic infections. Sulfapyridine has some effect but apparently not as great as that of sulfathiazole.

In addition to sulfathiazole ointment in superficial or surface infections, a number of other drugs may be employed. Silver nitrate may be used in acute infections either as 0.5 per cent silver nitrate ointment or as 2.0 per cent aqueous solution. In either case, the drug should not be used for more than one or two weeks. Because of its instability the ointment should be kept in an icebox and applied by the physician. The 2 per cent aqueous solution should be applied with a cotton applicator from which excess solution has been removed. The application should be made to the lid margins and the anesthetized palpebral conjunctiva, exerting care not to touch the cornea, and should be followed immediately by irrigation to prevent excessive cauterization.

A 1:5000 aqueous solution of zephiran may be given to the patient with instructions to instill one drop of the solution into the conjunctiva three or four times a day. In this concentration the drug may be used over a long period of time. Stronger concentrations may cause disturbances in the epithelium of the cornea.

SURGICAL THERAPY

Finally, surgical measures should be employed as indicated in conjunction with any or all of the above mentioned methods. Frequently immunization and chemotherapy hasten the localization of deep infections and in these cases drainage speeds recovery.

In chronic conjunctivitis there is almost always an associated chronic meibomitis and recovery is hastened by frequent expression or milking of the meibomian glands.

In conclusion we may summarize the treatment of ophthalmic disease due to staphylococci as follows:

I. Stye
  (a) Single
    1. Incise and
    2. Apply conjunctival antiseptic until healed.
  (b) Repeated and multiple
    1. Rule out refractive errors and general disease (as diabetes)
    2. Autogenous vaccine, or
    3. Sulfathiazole ointment, or both.
II. Blepharitis marginalis
    1. Rule out refractive errors and other contributory causes
    2. Examine meibomian glands and express if indicated
    3. Sulfathiazole ointment or
    4. Silver nitrate applications to the lid margins.
III. Conjunctivitis
  (a) Acute (newborn or adult)
    I. Usual conjunctival antiseptics.
  (b) Chronic
    1. Sulfathiazole ointment or
    2. Toxoid or both
    3. Express meibomian glands as indicated.
  (c) Acute exacerbation of chronic conjunctivitis associated with corneal lesions
    1. Sulfathiazole ointment or
    2. Antitoxin or both
    3. Express meibomian glands as indicated.
IV. Abscess (lid or orbit)
    1. Sulfathiazole by mouth if severe, or
    2. Antitoxin or both
    3. Surgical drainage as indicated.
V. Cavernous sinus thrombosis
    1. Sulfathiazole by mouth and
    2. Antitoxin and
    3. Drainage of orbit if indicated.
VI. Intraocular infections
    1. Sulfathiazole by mouth and
    2. Antitoxin and
    3. Appropriate treatment of lesions of adnexa, if present.

Bibliography

1. Allen, J. H.: Staphylococcic Conjunctivitis: Experimental Reproduction with Staphylococcus Toxin, American Journal of Ophthalmology 20:1025-1030 (Oct.) 1937.

2. Allen, J. H.: Experimental Production of Conjunctivitis with Staphylococci, American Journal of Ophthalmology 22:1218-1226 (Nov.) 1939.

3. O'Brien, C. S., and Allen, J. H.: Staphylococcus Conjunctivitis, American Journal of Ophthalmology 21:641-645 (June) 1938.

Swine Erysipelas and Erysipeloid[*]

W. L. Boyd[†]
St. Paul, Minnesota

SWINE erysipelas may be defined as an acute or chronic infectious disease caused by the erysipelas bacillus *(Erysipelothrix rhusiopathiæ)*. Pathologically the disease is manifested by dermatitis, gastroenteritis, hemorrhagic nephritis, swelling of the spleen, and degeneration of the heart, liver, and muscles. Its chief occurrence is in swine, but man, sheep, pigeons, turkeys, mice, and rabbits are susceptible. While swine erysipelas has long been considered a major swine disease in Central Europe, it is only within recent years that it has been considered of major importance in the swine-growing areas of the United States.

The bacillus of swine erysipelas was first isolated by Pasteur and Thuillier[1] in 1882-1883. In 1920, TenBroeck[2] isolated the organism from the tonsils of pigs. In 1921, Creech[3] recovered the organism from pigs affected with diamond skin disease. In 1931, the disease appeared in enzoötic form in South Dakota.[4] During this period, the disease was reported to exist in septicemic form in widely distributed places in the United States. The infection is known to exist in Minnesota, but its extent and importance remain to be determined.

In 1894, Theobald Smith[5] isolated from rabbits inoculated with tissue extracts from pigs sent to him from Minnesota an organism which he described as resembling *E. rhusiopathiæ*, although not positively identified. While we do not seriously doubt the existence of swine erysipelas in Minnesota as early as 1894, we are somewhat puzzled in attempting to account for the apparent failure of the infection to become one of the more serious ailments of Minnesota swine. This becomes more puzzling when one takes into account the fact that the disease is regarded as being of considerable importance in nearby states, notably Nebraska[6] and South Dakota.[4]

Etiology

E. rhusiopathiæ is a slender, small, straight or curved rod 1.0 to 1.5 M. in length as it is found in the organs of affected pigs. There the microörganisms tend to form small conglomerations and, as such, are often found to be contained in leukocytes. On artificial culture media, long thread-like forms of the organisms may be seen. This organism is non-motile, does not form spores. It takes the various anilin dyes, but is most readily shown by the Gram method. Though not a spore-former, it is quite resistant to adverse conditions; this is possibly due to the waxy substance which forms part of its composition.

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[*] Paper No. 1933, Scientific Journal Series, Minnesota Agricultural Experiment Station. Presented before the meeting of the Medical Staff of the Lymanhurst Health Center, Minneapolis, September 23, 1941.

[†] Division of veterinary medicine, Minnesota Agricultural Experiment Station, University Farm, St. Paul, Minnesota.

EPIZOÖTIOLOGY

The epizoötiological behavior of this disease is not a constant one. On the whole, the malady is inclined to occur enzoötically. Investigators in the state of Nebraska[6] have observed that in most instances the disease begins with a sudden onset, as was true also in South Dakota.[4] The spread of swine erysipelas, that is, its transmission from place to place, is subject to a number of contributory factors, among which the geographic position of the areas concerned, the density of the hog population, commerce and traffic in hogs, and the type of soil may have a place. That acutely or chronically affected animals may serve as the vehicles of the infection in its spread from place to place is generally recognized. Such infection vehicles as stable manure, body wastes, and slaughter offal cannot always be demonstrated in manifest erysipelas territory. On the other hand, such a means of transmission may be accepted as actual in instances where swine in remote, previously free areas develop erysipelas after the feeding of materials derived from diseased animals. Infected soil no doubt may serve as an infection reservoir, but as a vehicle for the dissemination of the virus it is probably not very important. Transmission of the disease by means of contaminated water courses is a possibility, but there are no clear-cut indications that it is of more than exceptional occurrence. The incidence of swine erysipelas is subject to the influence of season. It is highest during the third quarter of the year and lowest during the first quarter. The susceptibility to swine erysipelas is least marked in the age group under three months, the majority of the cases occurring in the age group of three to twelve months.

CLINICAL MANIFESTATIONS

As was previously pointed out, this infection in swine appears both in the acute and chronic types. The former is represented by the common septicemic form and by the more benign urticarial manifestations. The chronic form, which may be no more than the remote sequel of the acute form, expresses itself as valvular endocarditis and arthritis.

In the acute form there is an elevation of temperature from 105 to 110 F. It is not uncommon to find a large number of animals involved simultaneously. There is impairment of the appetite, and the affected animals segregate themselves from the rest of the herd. Respiration is hurried. The gait of the pigs becomes "stilty" and stiffened. At first the bowel movements are retarded and the feces are covered with mucus; as the disease advances, diarrhea may be noted. The frequency of the heart beat is increased; the pulse is rapid and intermittent. There may or may not be redness of the skin, particularly noticeable in breeds with unpigmented skin. The acute form runs a rather rapid course. Death within twenty-four to forty-eight hours after the first symptoms are noticed is not uncommon. It is generally believed that animals surviving the fourth day of illness have a chance of recovery. The prognosis in cases of this form must always be unfavorable unless very early serum treatment is possible. The case mortality ranges between 50 and 100 per cent.

The urticarial form, or the so-called diamond skin disease, constitutes a more benign form. Animals thus affected show a more or less vague systemic disturbance. Symptoms may be so mild as to escape the owner's attention. This general indisposition rapidly improves after the appearance of the characteristic skin eruptions. The case mortality of diamond skin disease has been estimated at 2 per cent. Joint involvement is a common sequel to swine erysipelas infection. It may occur as an independent manifestation, or it may follow in the wake of an acute attack. Endocardial involvement is most frequently found in animals which have apparently recovered, or even in animals that have never, so far as the owner knows, been ill. This condition is found in older swine. Death in such animals is sudden, and autopsy findings, with the exception of vegetative growth on the heart valves, are negative.

PATHOLOGY

The autopsy of pigs which have succumbed to the acute form of swine erysipelas shows lesions such as may be found in cases of any acute septicemia, with the exception of the lesions of the skin and those associated with chronic endocarditis. There are no pathologic changes that are at all pathognomonic. The lymph nodes may or may not be edematous and more or less congested. The spleen is commonly moderately enlarged, but this is not constant. The mucous membrane of the stomach is swollen and intensely dark red in color; the same may be said of the intestinal tract. The kidneys are usually enlarged, soft, and moist upon section. Histologically the kidney changes are essentially those of a glomerulonephritis.

In the chronic form of the disease the changes are most frequently found in connection with the mitral valves. Occasionally the aortic semilunar valves are also involved. The cauliflower-like mass attached to the valve is composed largely of granulation tissue and superimposed masses of fibrin. The arthritis of chronic swine erysipelas is probably initiated by a synovitis. As a result of inflammation, the capsular ligaments become thickened and there is a marked indication of periarticular induration.

DIAGNOSIS

The recognition of this disease is exceedingly difficult. Its diagnosis must be made with care, especially in areas where hog cholera and infectious necrotic enteritis are prevalent. In regions like southern Minnesota, one must always eliminate the possibility that hog cholera is the causative agent of the disease being investigated. Bacterioscopic and bacteriological examinations are of the greatest value. Schoening and Creech[7] have worked out with apparent success an agglutination test technic by which specific antibodies may be revealed in the blood serum. According to these workers, specific agglutinins appear in the blood rather early in the disease. More studies in connection with standardization of antigen will be necessary before this method will be generally accepted as a method of accurate diagnosis.

THERAPY

Medicinal treatment of diseased swine is worthless. The injection of swine erysipelas antiserum administered immediately after the first symptoms are shown will bring about recovery with surprising promptness. Immunization studies have been tried in one or two small areas. The United States Department of Agriculture, Bureau of Animal Industry, is at present carrying out some field experiments in the attempt to immunize swine by the use of virulent cultures and antiserum. The results of these experiments are being watched with great interest.

SWINE ERYSIPELAS IN ANIMALS OTHER THAN SWINE

Apparently sheep, lambs especially, have furnished the greatest number of cases in which this disease has been found in other animals. In sheep, the disease is largely of polyarthritic type. The disease has been found in a few instances in cattle. It has also been recorded in turkeys and in other fowls. The swine erysipelas bacillus was also recovered from various species of fish (Klauder[8]).

ERYSIPELOID

Erysipeloid, or a disease in man caused by an organism of the genus Erysipelothrix, was apparently described as early as 1873 by Fox, as cited by Klauder.[9] During the same period Baker, also cited by Klauder, described a condition which in all probability was erysipeloid, but which he called "erythema serpens." In 1884, Rosenbach (Klauder) published the results of his studies of erysipeloid, and in medical circles this infection is still known as the "erysipeloid of Rosenbach." In recent years, the disease has been reported as occurring among handlers of fish, both fresh and salt water varieties, abattoir employees, rendering-plant workers, and finally in students of veterinary medicine infected while engaged in dissecting horse cadavers. Practitioners of veterinary medicine, especially those who engage in the vaccination of swine, particularly hog cholera immunization, are occasionally infected. An article by Klauder[10] on erysipeloid as an occupational disease reports the source of infection or the occupation of 100 patients observed as follows:

Abattoir	58
Fish, retail	11
Tallow, grease, fertilizer	7
Veterinary students (dissecting horse)	6
Butchers, retail	3
Fishermen (pleasure)	3
Bakers (lard)	2
Clam opener	1
Food handler	1
Furrier (unfinished pelt)	1
Rabbit (removing skin)	1
Opossum (carrying animal)	1
Weaver	1
Dressmaker	1
Housewife (cleaning fish)	1
Fish handler	1
Kitchen worker	1

Had Doctor Klauder been studying this disease in the Corn Belt section of the United States he would, no doubt, have encountered numerous cases in practicing veterinarians.

Duration of the disease in man. In ten cases cited by Klauder, the duration was 7 to 10 days. Six of the patients were seen early and treated with local infiltration of immune serum, 6 to 15 cc., to which therapy the short duration was attributed. The duration was 1 month in eight cases, 45 days in one case, and 2 months, 3 months, and 8 months respectively in three cases. The maximum duration was 29 months (at the time of death), in the case of generalized cutaneous involvement. In the remaining 79 cases the duration ranged from 10 to 30 days. In the majority it was about 3 weeks.

So far as treatment is concerned, Klauder stressed the importance of rest and heat. The affected hand should be carried in a sling or more preferably in a splint. Wet or dry heat should be applied a few times daily. For local treatment, Klauder favored constant wet dressing with 12 per cent ichthamol in alcohol. He is uncertain as to the value of roentgen therapy. Of 48 patients treated with antiserum, 18 had serum sickness. As a result, this was discontinued in routine use. Recently it has been determined that in the cutaneous form of the disease in man the local application of immune serum packs is especially valuable. This latter information has been obtained from veterinarians employed in biological houses where immune serum is produced.

REFERENCES

1. Pasteur, L., and Thuillier, L.: La vaccination du rouget des porcs a l'aide du virus mortel attenué de cette maladie, Compt. rend. Acad. d. Sci. 97:1163-1171, 1883.

2. Ten Broeck, Carl: Studies on the *Bacillus murisepticus*, or the rotlauf bacillus isolated from swine in the United States, J. Exper. Med. 32:331-343, 1920.

3. Creech, G. T.: The bacillus of swine erysipelas isolated from urticarial lesions of swine in the United States, J. Am. Vet. Med. Assn. 59(2):139-150, 1921.

4. Fosterman, A. A.: Field experiences with swine erysipelas, Iowa Vet. 3(11):17-23, 1932.

5. Smith, Theobald: Investigations of diseases of domesticated animals, U.S.D.A., B.A.I., Ann. Rept. 12 and 13:166-174, 1897.

6. Van Es, L., and McGrath, C. B.: Swine erysipelas, Univ. Nebraska Agr. Exper. Sta. Research Bull. 84, 1936.

7. Schoening, H. W., and Creech, G. T.: Serological studies of swine erysipelas with particular reference to agglutination, J. Agr. Research 50(1)-71-79, 1935.

8. Klauder, J. V., Righter, L., and Harkins, M. J.: A distinctive and severe form of erysipeloid among fish handlers, Arch. Derm. & Syph. 14:662-678, 1926.

9. Klauder, J. V.: Erysipeloid and swine erysipelas in man, a clinical and bacteriological review; swine erysipelas in the United States, J.A.M.A. 86(9):536-541, 1926.

10. Klauder, J. V.: Erysipeloid as an occupational disease, J.A.M.A. 111(15):1345-1348, 1938.

Bilateral Subdural Hematoma in an Infant*

Edward L. Strem, M.D.
Alex Blumstein, M.D.
Minneapolis, Minnesota

CHRONIC subdural hematoma in infancy represents a clinical entity which is worthy of more emphasis. The disease is not uncommon in infants. Ingraham and Heyl[1] treated fifty cases over a period of ten years. However, they mentioned that the frequency with which subdural hematoma is found among infants and children is more or less proportional to the intensity with which it is sought.

In the majority of cases a history of trauma of some degree is obtained. Frequently there are other predisposing factors that must be considered. Sherwood[2] included hemorrhagic disease of the newborn, scurvy, rickets, and acute and chronic infections as such factors. He stated that, in the infant, trauma of delivery plus a bleeding diathesis was the most likely cause. Inghalls[3] stressed rickets and scurvy as the most important factors. He showed that many of the infants were illegitimate and lived in foster homes and a large percentage were never breast fed. This, he said, accounted for their predisposition to these avitaminoses.

The most common symptoms encountered in subdural hematoma in infancy are enlargement of the head, bulging and tense fontanels, and convulsions. Vomiting, irritability, and stupor have been noted in many cases. Depending on the extent of the hematoma, paralyses occur, and frequently choked disc has been seen.

Subdural hematoma has been of interest to the pathologist for many years because of a difference of opinion as to its pathogenesis: that is, whether the hemorrhage is actually a subdural hemorrhage or an intradural hemorrhage. Since the hematoma is surrounded by both an outer and an inner membrane, the question has arisen as to whether this membrane is a neo-membrane formed from the dura or a hemorrhage between the layers of the dura. Hannah[4] and Baker[5] are of the opinion the hematoma is intradural. They describe the hemorrhage as being in the inner capillary bed of vessels that lies between the two innermost layers of the dura. Munro, Merritt[6] and Gardner[7] postulate that a new membrane is formed around the blood clot by fibroblasts growing out from the inner layer of the dura. They also state that the osmotic pressure within the hematoma sac is gradually increased because of the liberation of protein from the breakdown of the hematoma. This causes a transudation of cerebrospinal fluid into the hematoma sac, thereby increasing its size. The thin, inner membrane of the hematoma and the closely approximated arachnoid act as a semi-permeable structure.

When a subdural hematoma is suspected in an infant, a puncture through the anterior fontanel into the subdural spaces should be made. A xanthochromatic to a grossly bloody fluid, high in protein content, is obtained.

The treatment of this disease in infants is radical.[1] The usual course of treatment is frequent fontanel punctures until pressure within the skull is gradually reduced. This is followed by making burr holes to facilitate further drainage, and the introduction of air to determine by X-ray the extent of the hematoma sac. Finally, bone flaps are turned down and as much as possible of the limiting membranes are removed.

Case Report

A male negro infant aged three months was admitted to the Minneapolis General Hospital because of a convulsion one hour previously. The child had been perfectly well up to the time of the attack which occurred during a feeding.

The past history revealed that the patient had been one of twins, born at this hospital, weighing 4½ pounds. Delivery was spontaneous and no abnormalities, such as cyanosis or convulsions, were noted at birth. The child was cared for in the premature nursery and was discharged in one month, much over his birth weight. The infant had never been breast fed; however, the formula seemed adequate since the child had been gaining weight. Vitamins had been given in adequate amount since the age of two weeks.

Physical examination on admission revealed a very lethargic infant. The neck was rigid and the anterior fontanel was tense and bulging. There were no other positive physical findings.

A lumbar puncture was done immediately. Analysis of the spinal fluid showed 20 cells, 95 per cent of which were mononuclear cells; sugar, 62 mg. per cent, and no bacteria on both direct smear and culture. Following the spinal puncture the infant appeared much more alert and cried lustily. Additional laboratory procedures showed a hemoglobin of 74 per cent, a leucocyte count of 8,100 cells, with 66 per cent polymorphonuclear cells, and an urinalysis which was negative. A serum phosphorus and calcium was done and was 4.2 and 12.6 mg. per cent respectively.

The patient's hospital stay was uneventful and he was discharged after four days for further work-up in the outpatient clinic.

The infant was admitted again on December 13, 1940. There was history of the patient having had nine convulsive seizures since discharge from the hospital, and projectile vomiting had occurred occasionally. The mother stated that she thought the child's head was getting too large. She had compared this child's head with that of his twin brother and noted a difference.

The significant physical findings were lethargy; hydrocephalus, the head circumference being 43 cm.; a tense and bulging anterior fontanel, rigid neck, and symmetrically hyperactive reflexes. A spinal puncture was performed and the pressure found to be 350 mm. of water, and the fluid was grossly bloody.

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*From the department of pediatrics, Minneapolis General Hospital, and the division of nervous and mental diseases, University of Minnesota.

Further work-up revealed a normal blood and urine. The Mantoux reaction (1:10,000) was negative. The vitamin C content of the blood was 1 mg. per cent; platelet count, bleeding and clotting time were normal. The prothrombin content of the blood was normal. Serum phosphorus was 6.2 mg. per cent and serum calcium 11.7 mg. per cent.

On December 18, 1940, bilateral taps of the subdural space were done at the lateral angles of the anterior fontanel and approximately 15 cc. of a sterile bloody fluid drained from each side. On centrifuging, the supernatant fluid was found to be xanthochromic. Drainage of the subdural spaces was then done on alternate days until operation. It was significant that the patient no longer had any symptoms while the subdural spaces were being tapped.

A roentgenographic study was done on December 24, 1940, at which time an air-encephalogram revealed uniformly dilated ventricles. The dilated ventricles in the presence of bilateral subdural hematomas is interesting from the standpoint of cerebrospinal fluid absorption. There was no block in the ventricular system. It would seem that absorption of the cerebrospinal fluid by the cortical veins was definitely impeded by the overlying hematomas. This is a probable explanation of the dilated ventricles in this case. On January 4, 1940, air was injected into the cranial subdural spaces and a roentgenogram taken. The left subdural space appeared to be larger than the right.

The patient was first operated upon January 11, 1941. Under local anesthesia a right osteoplastic flap was reflected at the parietal region. The contents of a subdural hematoma were evacuated and as much as possible of the inner membrane removed. The patient's convalescence was uneventful. The same procedure was done on the left side January 22, 1941. Again recovery from the operation was not complicated.

On February 8, 1941, the head circumference was 45 cm. and the patient was symptom-free. He was discharged as improved.

Five days after leaving the hospital, on the morning of February 13, 1941, the child was found dead. The child seemed to be in perfect health and had had no symptoms while home.

PATHOLOGIC REPORT

The only significant findings were in the brain and meninges. On both sides beneath the dura were hematomata which extended from the frontal to the occipital poles. The outer membranes were firmly adherent to the dura but could be stripped from it. The inner membranes in most areas were loosely adherent to the underlying pia-arachnoid. In many areas the inner hematoma membranes with the involved pia-arachnoid were adherent to the underlying cortex. On gross section of the brain, there were numerous punctate hemorrhages throughout the gray and white matter. These were present in the cortex, the underlying white matter, the basal ganglia, pons, and medulla.

Microscopic sections confirmed the presence of hemorrhages. Those areas of cortex covered by the adherent membranes showed degeneration of cells and disorganization of the architecture. The parietal lobes on both sides were involved in this process.

It is highly probable that death was associated with convulsive seizures due to cortical scarring and adhesions. Such an interpretation would account for the punctate hemorrhages.

BIBLIOGRAPHY

1. Ingraham, Franc D., Heyl, Henry L.: Subdural Hematoma in Infancy and Childhood, J.A.M.A. 112:198 (Jan. 21) 1939.

2. Sherwood, David: Chronic Subdural Hematoma in Infants, Am. J. Dis. Child. 39:981 (May) 1930.

3. Inghalls, T. H.: The Role of Scurvy in the Etiology of Chronic Subdural Hematoma, New England J. Med. 215:1279 (Dec. 31) 1936.

4. Hannah, J. A.: The Etiology of Subdural Hematoma; Anatomical and Pathological Study, J. Nerv. & Ment. Dis. 84:169 (August) 1936.

5. Baker, A. B.: Subdural Hematoma, Arch. of Path. 26:535 (August) 1938.

6. Munro, D., Merritt, H. H.: Surgical Pathology of Subdural Hematoma Based on Study of 105 Cases, Arch. Neurol. & Psych. 35:64 (Jan.) 1936.

7. Gardner, W. J.: Traumatic Subdural Hematoma with Particular Reference to Latent Interval, Arch. Neurol. & Psych. 27:847 (April) 1932.

Coronary Thrombosis*

Julius O. Arnson, M.D.†
Bismarck, North Dakota

IN spite of the vast amount of publicity regarding coronary thrombosis, its diagnosis is often missed, for coronary disease presents a complicated and bizarre symptomatology. The classical picture of substernal constricting pain, referred into the periphery of the chest, shoulders, or arms, is often absent. Epigastric localization of pain causes the clinician to suspect gallbladder colic, duodenal accidents, or pancreatitis, especially when auscultation so often reveals no apparent disorder of the heart function. Coronary occlusion is sometimes painless, its effects being presented as a sudden dyspneic attack with changes in the heart's rhythm, tachycardia of the ventricles, auricular fibrillation, auricular flutter, and the rapid onset of myocardial failure. And it must be held in mind that other serious conditions besides coronary thrombosis cause pain in the chest, such as massive collapse of the lung, acute pneumothorax, pulmonary embolism, aortitis, and aortic aneurysm. The first attack of pain may be no more than an ordinary angina, to be followed by symptoms of greater severity in a few hours or even days.

In considering the diagnosis of coronary thrombosis, our attention is first arrested by angina. It is usual, if the history is carefully investigated, to find angina of effort present over a period of time preceding the accident. In differentiating between true angina and conditions which simulate it, we find that true angina is definitely associated with unusual exertion, the degree of exertion required to bring on the pain being variable and dependent upon the degree of interference with coronary blood flow. In false angina, pain is more likely to be sharp and short, instead of steady and constricting in nature, located most often in the left pectoral region. False angina may be associated with other nervous phenomena—tachycardia, nervous irritability, anorexia, loss of weight, cold clammy hands, breathlessness, and sighing. It is common in neurocirculatory asthenia. Osteoarthritis of the dorsal spine may give rise to pains which simulate anginas.

There are other conditions which, though not the result of coronary vascular disease, produce paroxysmal pain which originates in the heart. It is recognized by most physiopathologists that the anginal syndrome is due to ischemia of the heart muscle. This may be relative or absolute. By relative we mean a temporary disparity between blood flow and metabolic requirement. In severe simple anemia and pernicious anemia the myocardium may receive an inadequate blood supply.

Because the heart muscle requires carbohydrate, as well as oxygen, to function properly, reduction of blood sugar in hypoglycemic states may produce angina.

Hypotension and paroxysmal tachycardia both may produce angina by lessening the volume flow in the coronary circulation; hypotension because the coronary vessels fill during diastole and the beginning of systole, depending greatly on diastolic pressure for their blood supply; and tachycardia because the rapid contractions expel a markedly decreased total volume into the circulation.

The excessive use of tobacco, through its vasoconstricting action, is also responsible for anginal pain.

The use of digitalis in tachycardia with normal rhythm may produce angina.

The diagnosis of coronary thrombosis should not be missed if a careful anamnesis is obtained and if all the facts in the acute episode are adequately considered. Most subjects will give a history of the anginal syndrome, the presence of hypertension of long standing, or attacks of paroxysmal dyspnea. When one is confronted by a patient in the susceptible age group who complains of an acute attack of epigastric or chest pain, with a history suggesting mild myocardial embarrassment, he should be on his guard, even if the attack is not typical. Such a patient should be managed as if he had an occlusion. Observation of subsequent events will prove the diagnosis. In thrombosis the temperature often rises moderately, leucocytosis of varying degree occurs, and the sedimentation rate is accelerated. In 10 to 20 per cent of the cases, if the precordium is frequently auscultated, the fleeting pericardial rub may be heard.

If electrocardiography is available, early tracings should be made and repeated every day or two. This procedure is invaluable, not only in corroborating the clinical diagnosis, but in observing the retrogression or extension of the pathological process in the myocardium. The electrocardiogram and the sedimentation rate give us the most reliable information regarding the progress of the lesion.

Once coronary thrombosis is suspected or diagnosed it is essential that proper treatment should be promptly instituted. Constant attendance of the physician may be necessary because life may be saved or lost there and then. Morphia in large enough doses to relieve pain must be administered and it must be remembered, in this condition above all others, larger than the usual doses are necessary and are well tolerated by the patient. The nitrites here are all but useless; in fact, they may be dangerous because their vasodilating effects may, by reducing the blood pressure, aggravate the ischemia already present in the myocardium.

Oxygen administered by tent, mask, or nasal tube is a most valuable accessory to treatment which may well be a life saving measure. Commercial oxygen is available in the garages or machine shops in every community and we believe that every practitioner should have ready for such emergencies a reducing valve and inhalation apparatus. Very satisfactory oxygen masks are available at reasonable prices.

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*From a symposium presented before the North Dakota State Medical Association, Grand Forks, May 20, 1941.

†Quain and Ramstad Clinic.

After pain has been controlled, the barbiturates should be used to insure rest and the tranquility of the patient.

During the first three or four days physical exertion should be absolutely abolished, indeed even bowel function should be restricted. The diet should be liquid, but well supplied with carbohydrate.

When the acute phase is past, bear in mind that disaster always threatens. In the first week or ten days usually there is danger of extension of the infarct, danger of rupture of the myocardium into the pericardial sac, or danger of pulmonary embolism. When the dangerous period is over, more liberties may be granted. The diet may be increased, but it should remain light and of low caloric value. In diabetics, insulin should be administered with great care because a high level of blood sugar is advantageous to the heart muscle.

It has long been believed that arteriosclerosis was due to degenerative changes, but the contributions of Leary and Willius and his associates incline us to the belief that it is caused by a disturbance of lipoid metabolism. Willius reports 78.5 per cent of the cases of coronary disease showing definite increase of some lipoid fraction, cholesterol, cholesterol esters, lecithins, fatty acids, or total lipoids.

Males are affected five times more frequently than females, except, after the age of 70, the incidence is equal in both sexes. This influence of sex is probably based on the lack of some adjustment in lipoid metabolism which women possess in excess of men. It is well known that during pregnancy there is an increase in lipoid reserve designed for the nutrition of the fetus.

Mortality statistics would indicate that the incidence of coronary thrombosis is greater among professional men than among workers. But caution must be used in interpreting such statistics inasmuch as there is a question as to whether the diagnosis of acute coronary occlusion is made with equal accuracy in all occupational groups.

Heredity certainly predisposes to arteriosclerosis. It is common clinical experience to find the accidents of cardiovascular disease occurring too frequently in family groups to be purely coincidental.

The stress of modern competitive life undoubtedly predisposes to arterial pathology, but probably these influences act to accelerate a condition already present and precipitate disaster. The close association of hypertension and coronary thrombosis cannot be denied. Hypertension causes hypertrophy with its resulting embarrassment of myocardial function and hastens pathologic change.

The role of tobacco is still a matter of controversy, but every year more cardiologists come to believe that it is definitely influential in producing arterial disease. It is our opinion that the increasing use of tobacco in excess explains in some measure the increased incidence of coronary disease in younger age groups. While the greatest number of cases of coronary disease occurs in the fourth decade, it is alarming to note the trend toward earlier age groups. Unquestionably, the general incidence of coronary disease is increasing, but as yet no satisfactory approach has been developed to solve the problem.

Correction of the dietary habits is first in order. Man, from early age, consumes a much larger proportion of fats than any other animal. Beginning in early life, the elimination of fats from the diet to a large degree can have only a salutory influence on the arterial walls.

Decreasing the tempo of life, both in business and in sport, would be a step in the right direction.

Once arterial disease is established, treatment resolves itself into restriction of mental and physical activity and the use of appropriate medication.

Among the drugs available the nitrites are preëminent. None surpasses nitroglycerine for the relief of anginal pain. However, in the acute attack of thrombosis they more often fail than succeed in alleviating pain.

The xanthines of which theobromine, theophylline, and aminophylline are the best examples are of doubtful value in the treatment of coronary sclerosis. No scientific proof is available to establish them in the reputation they have somehow achieved in the relief of the symptoms of this condition. One author states, "The results of the study of one hundred cases of angina pectoris showed that patients with coronary disease and effort angina obtain no more relief in their cardiac pain from these compounds than they do from sugar or milk administered in the same way." They are, however, of great value in producing diuresis in congestive heart failure. In respiratory depression with Cheyne-Stokes respiration their administration intravenously often produces marked improvement.

The use of digitalis in coronary thrombosis, for some unaccountable reason, has been controversial. Some authorities disclaim any value from its administration, indeed, they condemn it as dangerous because it diminishes the coronary flow and increases the work of the heart. We admit that during the precarious stage, when the insult is at its maximum and when danger of rupture of the myocardium is imminent, digitalis should be avoided. But when auricular fibrillation and myocardial failure appear, there can be no logical reason why digitalis should not be used. Careful observation for the appearance of premature ventricular contractions, when the dosage of the drug should be decreased, will avoid disaster.

The indication for diuresis is the development of edema from congestive failure. Salyrgan with theophyllin or mercupurin with or without ammonium nitrate may be used.

It is, of course, difficult, if not impossible, to outline a stereotyped treatment for a lesion with as variable a symptomatology as coronary thrombosis. However, when we perceive that many cases run their course and recover with little or no medical treatment, let us consider that harm may be done by over-treatment. While the agents at our command may at times avert disaster, it is our opinion that the fulminant patient who has marked damage to the myocardium, dies in spite of all treatment. Then the most important role of the attending physician in coronary thrombosis is not in the administration of drugs, but in the management of the adjustment of the patient so he may continue a useful and comfortable life.

Valvular Heart Disease*

Paul Rowe, M.D.
Minot, North Dakota

STATISTICS obtained from the State Department of Health disclose that there were 5,125 deaths in the state of North Dakota during the year 1940. Of this number, 1,340 deaths were caused by heart disease, and of these deaths, 166, or slightly more than 12 per cent were classified as due to "chronic endocarditis, valvular heart disease or chronic affections of the valves and endocardium."

Valvular heart disease is the result of structural change in one or more of the valves. It is often the primary cause of heart failure. Functional valvular incompetence, due to cardiac dilatation, should not be included under the term valvular disease, but must be considered in the differential diagnosis of organic valvular lesions. Congenital valvular heart disease will not be discussed.

Valvular heart disease is primarily due to acute infection, such as acute rheumatic fever, acute and subacute bacterial endocarditis, terminal verrucous types of endocarditis, and syphilitic invasion or rarely tuberculous infection of the valves. It is at times caused by atherosclerotic changes, often with calcification, particularly of the aortic valve, without evidence of preceding infection. Rupture of inflamed valves may occur or calcific changes may take place in valves previously deformed by infection. Often subacute bacterial endocarditis is superimposed on chronic valvular disease.

Valvular disease occurs in both sexes and at any age. It is more common between 15 and 30 where rheumatic fever is prevalent, and between 40 and 55 where syphilitic aortitis is encountered. In the earlier ages the female is more frequently affected, but in later life the disease appears more often in the male as a result of syphilis or arterial sclerosis.

Clinically, it is often difficult or impossible, in spite of all available methods of study, to determine whether valvular insufficiency is due to disease of the valve itself, to cardiac dilatation with normal valve or cardiac dilatation combined with valvular disease. This is especially true in advanced heart failure. In this case it is of less significance as far as prognosis and treatment are concerned whether the valves are diseased or not, as the loss of compensation is the important feature. In the earlier cases without failure, and with relatively little cardiac enlargement, differentiation between an individual valve lesion or a functional defect is much more important, and often possible by close study and combined methods of examination.

The mitral valve is damaged in over half of all cases of valvular heart disease. Involvement of the aortic valve is next in frequency. The tricuspid valve is rarely deformed to any important extent by endocarditis and the pulmonary valve is very infrequently involved.

Mitral disease, in most cases, is due to rheumatic infection, and is synonymous with rheumatic fever up to 40 years of age whether encountered in the acute stage or as a chronic lesion. Although the acute stage of the rheumatic infection may not be recognized because of indefinite signs and symptoms, the resultant cardiac involvement, whether associated with rheumatism or other allied infections of a focal nature, is regarded as of the rheumatic type. Factors favorable to rheumatic disease such as focal infection, cold, damp climate, and poor living conditions increase the incidence of mitral disease. Many cases of mitral stenosis secondary to rheumatic heart disease are first discovered during adolescence or early adult life. An accurate history will usually elicit evidence of some type of rheumatic manifestation in childhood. The mitral valve is almost always involved in childhood rheumatic disease, but the fibrosis following healing of minimal involvement may not cause incompetency of the valve during the early years. With growth, the heart and its chambers enlarge, but the mitral orifice may retain its childhood dimensions due to fibrosis from the childhood attack, and give no signs or symptoms of stenosis until the heart chambers and valves reach adult size with approaching maturity.

Rheumatic fever should be considered essentially as a disease of the heart and in no sense as a disease limited to the joints. Rheumatic heart disease involves the whole heart, and according to our present knowledge rheumatic carditis constitutes the most important phase of rheumatic fever. In active rheumatic disease the myocardium is practically always involved, as well as the endocardium, which includes the mitral and aortic valves, and in severe cases the pericardium. Cardiac enlargement, probably due to dilatation, usually appears within the first few days during an acute attack. Shift of the cardiac dullness and apex beat to the left can be demonstrated on daily observation of most young patients. The apex beat becomes diffuse, the first sound softer and the second pulmonic tone may be accentuated. A systolic murmur often appears at the apex. With improvement in the fever and arthritis these signs may disappear in both the child and the adult, but almost invariably in children this improvement is followed by evidence of progressive valvular disease.

While the acute stage of rheumatic fever usually subsides in a few weeks, signs of continued activity of the rheumatic process may persist for months. The heart should be protected by rest in bed, not only during the relatively short acute phase, but also until all evidence of rheumatic activity has subsided. In a carefully studied group of 54 children recently reported by Bland of Boston, the average duration of recognized rheumatic activity was eight months with a maximum duration of two and one-half years in one patient.

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*From a symposium presented before the North Dakota State Medical Association, Grand Forks, May 20, 1941.

According to White the earliest valve defect in rheumatic children is more regurgitant than stenotic, and the mitral murmurs heard during the first year after the onset of rheumatic infection in a child are attributable to dilatation of the left ventricle from rheumatic myocarditis and not due to deformity of the mitral valve. Such murmurs may disappear with recovery or eventually merge into those of mitral valve disease. Mitral stenosis develops gradually, requiring about two years for its establishment.

Acute endocarditis may heal with only slight thickening along the line of closure of the valve cusps, leaving no defect in valve function. Marked repeated inflammation causes greater damage, and contraction of the resultant scar tissue may cause all grades of valvular deformity. Mitral stenosis and regurgitation are nearly always combined lesions pathologically, with one or the other lesion predominant. High grades of organic mitral stenosis are much more common and better tolerated than high grades of organic mitral regurgitation.

Pronounced mitral stenosis and regurgitation result in engorgement of the pulmonary circulation, with decreased aeration of the blood, accumulation of serum into the alveoli and bronchioles, and a tendency to bleeding and edema. Dyspnea is the chief symptom of mitral valve disease. It is produced on effort when the lesion is moderate, and occurs at rest, when there is a high degree of pulmonary engorgement. Paroxysmal dyspnea is usually associated with a high grade of mitral stenosis. The dyspnea in mitral stenosis is due to the obstruction to the circulation by the narrowed valvular orifice, and not to left ventricular failure. Complicating auricular fibrillation, congestive heart failure, or marked enlargement of the left auricle may produce other symptoms.

Of the common heart lesions mitral stenosis is most likely to escape detection. The lesion is much more common in women than men. Often an unsuspected mitral stenosis is discovered because of a complication such as sudden hemoptysis or a cerebral embolism. In simple uncomplicated mitral stenosis there is, as a rule, little difficulty in making a diagnosis, but the lesion, especially in early cases is not always easily detected.

A rumbling diastolic murmur, with or without presystolic accentuation, at the apex, is the most characteristic sign of mitral stenosis. It is generally heard over a restricted area 2 or 3 centimeters in diameter at or near the apex, and is best heard with the patient recumbent. Frequently a slight shift of the patient from the prone to the left lateral position will bring out a diastolic or presystolic murmur. Whether the murmur is presystolic or diastolic depends upon associated cardiac conditions. It is presystolic when the heart is compensated and often diastolic when compensation is broken. Usually with the development of auricular fibrillation the presystolic murmur disappears from lack of the rhythmic contractions of the auricle in forcing the blood through the narrow orifice. The murmur is the most variable of all cardiac murmurs and may be present or absent on the same day, especially with change of position of the patient. If the valve lesion is recent the murmur is more likely to change. The murmur may be timed by palpating the systolic shock. As mitral regurgitation frequently accompanies mitral stenosis, the regurgitant murmur may be so loud it obscures the murmur of stenosis.

Other helpful findings, if present, are a palpable diastolic thrill at the apex, a loud snapping first sound at the apex and marked accentuation or reduplication of the pulmonic second tone. This is best heard in the left third interspace and caused by the high blood pressure in the pulmonary artery from the back pressure of the blood in the lungs.

The electrocardiogram frequently reveals the presence of right axis deviation in mitral stenosis. Auricular fibrillation is the most common arrhythmia. X-ray, in early cases, discloses a small ovoid cardiac shadow with some enlargement of the left auricle, and, late in the disease, increase of the cardiac silhouette in the region of the infundibulum of the right ventricle from dilatation of the right heart.

The chief complications of mitral stenosis are pulmonary congestion without heart failure, auricular fibrillation, and right ventricular failure.

Mitral stenosis must be differentiated from other conditions producing a diastolic murmur over the heart. While systolic murmurs are frequently accidental or due to functional or relative incompetence of the valves, diastolic murmurs are almost always of organic origin. The diastolic murmur of aortic regurgitation may be quite distinct over the mitral area but is always loudest at the base of the heart, usually in the second right intercostal space, and is well transmitted down the right or left border of the sternum. Marked pulsation of the cervical vessels, a water hammer pulse, capillary pulsation, thrill, Duroziez's sign, cardiac hypertrophy, history of syphilis or a positive Wassermann are all helpful aids. The Austin Flint murmur is a secondary diastolic murmur sometimes heard at the apex in aortic regurgitation in the same location as the murmur of mitral stenosis. It is probably due to dilatation of the left ventricle causing a relative functional mitral stenosis. The Graham Steell murmur is heard in a small percentage of cases of mitral stenosis as a soft blowing diastolic murmur in the third and fourth interspaces to the left of the sternum and follows the second sound. As far as can be determined this murmur is due to dilatation of the right ventricle with functional regurgitation through the dilated pulmonary valve. Tricuspid stenosis, which is comparatively rare, and is usually accompanied by mitral stenosis, may cause either a presystolic or a diastolic murmur, best heard on the right side of the sternum out toward the right nipple. The early appearance of marked cyanosis and extensive edema favors the predominance of this lesion over mitral stenosis.

The course and prognosis of valvular heart disease is variable and dependent upon numerous factors, such as etiology, extent of the lesion, type of predominant involvement, age of the patient, the presence of combined lesions, and complications. Slight valvular lesions causing little deformity may not interfere with valvular function enough to cause any signs or symptoms. The behavior of such a heart is similar to that of a normal heart. However, slightly deformed valves are always of some significance because of lessened resistance and greater susceptibility to re-infection than normal valves. Extensive valvular defects of rheumatic mitral stenosis or aortic regurgitation may permit long years of life with a damaged heart, or result in much cardiac enlargement and heart failure. Rheumatic infection in childhood is prone to recurrence, with increasing valvular damage during each new attack. Over half the patients with marked mitral stenosis in youth develop auricular fibrillation, and usually die of congestive heart failure. The average duration of life after establishment of a well marked mitral stenosis is ten to twenty years, although death may occur in a few months or be delayed for a great many years. In marked mitral regurgitation the heart strain is greater than in mitral stenosis and the patient usually lives but a few years.

The prognosis in aortic valve disease is generally considered to be more serious than mitral valve disease, chiefly because it is often caused by a neglected syphilitic infection. Aortic valve disease is frequently of slight degree and if a result of rheumatic infection may be compatible with a long and active life. In marked aortic regurgitation the heart becomes very large, and if it is of luetic origin the patient rarely lives more than a few years. Aortic stenosis offers a somewhat better outlook than aortic regurgitation because of the absence of syphilis, and because the amount of work done by the left ventricle is only moderately increased. When congestive heart failure appears in aortic valve disease it is difficult to control, recurs quickly and the period of survival ranges from a few months to two years.

Bacterial endocarditis is a common complication of rheumatic valvular heart disease and occurs somewhat less frequently as a complication of atherosclerotic and deforming syphilitic aortic valvular disease. The prognosis, once such a complication occurs, is essentially that of the complicating bacterial endocarditis.

Bibliography

Bell, E. T.: Text Book of Pathology, ed. 3; Philadelphia, Lea & Febiger, 1938.

Bland, E. F.: Rheumatic Fever in Childhood, New England Journal of Medicine 224:629, 1941.

Cecil, R. L.: Text Book of Medicine, ed. 5; Philadelphia, W. B. Saunders, 1940.

Tice, Frederick: Practice of Medicine; Hagerstown, W. F. Prior Co., 1940.

Torrey, R. G.: Tice Practice of Medicine; Hagerstown, W. F. Prior Co., 1938.

White, Paul D.: Heart Disease, ed. 2; New York, The Macmillan Co., 1937.

Cardiac Arrhythmias*

W. H. Long, M.D.

Fargo, North Dakota

CARDIAC irregularities bring more patients to our offices than any other of the cardiac complaints. The fact that many of these prove to be disturbances due to minor functional disorders, often of purely reflex origin, does not detract from their importance in the mind of the patient. In fact, some of those of the least significance from the standpoint of structural damage are those most alarming to the patient; therefore, we should consider each complaint most carefully, endeavoring to make the most exact diagnosis and its significance. The patient is entitled to an accurate prognosis and explanation of the mechanism for his assurance.

The commonest type encountered is extra systolic irregularity. The descriptions of the sensations experienced from this disorder are often bizarre. I have often been surprised by the panic of patients who had experienced a series of these extra beats, especially at night. We must not be content to tell these people to forget their condition, and we must be certain that they are convinced that our investigations have been careful enough and extensive enough to assure them that there is no serious underlying heart damage. If this type of irregularity is found and has not been noted by the patient, it is probably better not to tell him of its presence.

The presence of many extra systoles in older individuals, especially those with coronary sclerosis or with hypertension, may demand treatment, and when they develop in cases under management, these irregularities are likely to indicate progressive muscle damage. At times in younger individuals without evidence of myocardial damage, they demand treatment because of the annoyance of the irregularity. The treatment consists of the elimination of such nervous irritants as coffee and tobacco, the relief of flatulence, and the prevention of fatigue. Sedatives are valuable. Quinidine is also valuable; the effect of quinidine is augmented by combining it with strychnine, using three grains of quinidine with 1/30 gr. strychnine three times daily.

In some cases under treatment with digitalis, the increased number of the extra beats becomes annoying and occasionally leads to actual ventricular tachycardia. These cases have been treated by the use of quinidine. Our first experience with the use of quinidine was interesting.

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*From a symposium presented before the North Dakota State Medical Association, Grand Forks, May 20, 1941.

The rate could be well slowed by digitalis; then the extra systoles would become very frequent and distressing. After stopping the digitalis and being placed on quinidine, the patient became comfortable when the extra beats were largely abolished, but the rate again became rapid and decompensation again ensued. Finally both drugs were used simultaneously with very gratifying results. This has since been found advantageous in a number of similar cases.

The next type of irregularity in frequency is auricular fibrillation. This, in contrast to extra systoles, is an extremely important disease and occurs only in structurally damaged hearts. It may occur as temporary paroxysms of fibrillation; more often it is encountered as a permanently established arrhythmia. The commonest diseases which bring about this state are hypertensive heart disease, mitral stenosis, and hyperthyroidism.

The effects of auricular fibrillation are intrinsically injurious; in fact, it can be shown in animals with normal hearts which are thrown into fibrillation that the cardiac output is decreased by thirty per cent; therefore, a patient with damaged heart valves or muscle must be susceptible to severe injury. In the hypertensive, the onset of fibrillation is usually accompanied by a considerable fall of systolic pressure. There is likewise significant increase in venous pressure. These changes are due to the large numbers of inefficient ventricular contractures, many of which fail even to propel the blood with sufficient force to effect a radial pulse. The great rapidity of the ventricular responses deprives the muscle of its normal period of rest resulting in ultimate exhaustion. We see thus that we have all the factors needed for the development of decompensation, or congestive heart failure. These factors account for surely more than half of such cases.

In the treatment of this arrhythmia we should give serious consideration to the prevention of fibrillation, as well as to congestive failure. Quinidine in the well-compensated case can be used to convert the fibrillation to normal rhythm without fear of any complications, beyond the usual signs of toxicity of the drug, which are tinnitus and ringing in the ears, epigastric distress, and nausea. The dosage to be used in the prevention of paroxysmal fibrillation is usually 3 to 4 grains, three times daily, to be used continuously. Quinidine in the well-compensated, permanently established fibrillation should effect a gradual saturation with one or two 3-grain doses daily; then, if none of the idiosyncrasies become evident, this dose is given every three hours until regular rhythm has been restored. After restoration of normal rhythm a ration dose of 3 or 4 grains three times daily is continued indefinitely. The permanence of such effect is variable, but may continue for years.

The use of quinidine in the decompensated cases is quite another matter. The drug itself is depressant to the heart muscle. It is thought also to exert a direct depressant action on the respiratory center as does quinine. The hazard which has been most emphasized in its use is that of dislodging the mural thrombi from the over-stretched, non-contracting wall of the auricle when that structure resumes regular contractions with the establishment of regular rhythm. The resulting embolism has proved fatal in some cases. In my experience this danger has been over-rated, and two cases which I have lost from embolism occurred while they were being prepared for quinidine therapy by digitalis. A third case died suddenly in her sleep; previously digitalized, she had been sent to the hospital for quinidine. She received 2 grains at 2:00 P. M. the first day, and 2 grains at 2:00 P. M. and 4:00 P. M. the second day. She was seen at 8:00 P. M. and no untoward symptoms had been experienced. At 3:00 A. M. she was found dead by the nurse; autopsy was refused. In order to minimize the danger of embolism, it is absolutely necessary that compensation be restored and the rate of ventricular contraction be well slowed before using quinidine. When this has been accomplished, the quinidine is then administered as prescribed for the well-compensated case.

The efficiency of digitalis in the treatment of auricular fibrillation with congestive failure cannot be denied. Its effect is certain, and is exerted by improving the tonicity of the muscle and by slowing the contractions of the ventricles. As the rate is slowed, the number of inefficient beats is diminished and the refractory period is increased, allowing adequate rest for the ventricular muscle. The dosage should be such as to establish apex rates in the neighborhood of seventy and to reduce the apex wrist deficity as greatly as possible.

The administration of digitalis should be by a regular plan; in urgent cases it may be used by vein in 4 cat-unit doses, repeated every two and three hours until its effect is established. In less urgent cases where there is nausea and vomiting, it may be used intramuscularly. But usually 1 or 2 cat-units every four hours by mouth until slowing is established is the method of choice. Then, when slowing occurs, which is usually after 12 to 14 cat-units, a ration dose of 1 to 1½ cat-units daily will maintain the effect indefinitely.

It is essential that we each become familiar with one specific preparation so that we know what to expect of certain dosages. Above all, the dose should be accurately measured always. It is essential also that we recognize the signs of overdosage, which are nausea, vomiting, coupling of the apex beat, and disturbances of vision and mentality. The latter two are fairly common in older individuals and are often overlooked.

Another possibility, which should be mentioned, is the development of digitalis poisoning after the use of mercurial diuretics in decompensation. The edema fluids contain a considerable concentration of the drug which is distributed throughout the body. As the fluid is mobilized by the diuresis, there is a resulting concentration which may bring about toxic effects in the heart muscle. The value of mercurial diuretics as an aid in these cases cannot be overemphasized, and the rapidity of their action saves these patients days of discomfort.

The next disorder of rhythm in order of frequency is paroxysmal tachycardia. This disturbance is a fairly common one and is spoken of usually as attacks of palpitation. It consists of a series of extra systoles arising from varying points of origin in the auricle, junctional tissue, or more rarely, from the ventricle. The attacks are of varying duration and are always highly disturbing to the patient. Only rarely will they continue long enough to cause actual circulatory embarrassment.

The treatment of the attacks consists of prevention as in the case of extra systoles, avoiding fatigue, irritants, flatulence. For the attack the simplest treatment which is highly efficient consists of vagus stimulation by ocular pressure or by pressure on the carotid arteries. If this procedure fails, the use of syrup of ipecac in teaspoonful doses, repeating the dose in 20 minutes to produce vomiting, is often effectual. Ipecac has a direct action on the heart muscle as well as a vagus effect dependent upon the act of vomiting. If these methods fail, Acetyl-B methylcholine in the form of mecholyl is given in ½-grain dose subcutaneously.

Mecholyl is a relatively new drug and is remarkably efficient in slowing the heart by vagus stimulation. It is a powerful parasympathetic stimulant and the accompanying symptoms are often alarming. These consist of marked vasodilation with a fall of blood pressure, salivation, sweating, gastrointestinal motility, and bronchial spasm. Thus it is absolutely contraindicated in the presence of bronchial asthma. It should be given only with the patient in the recumbent position. It may bring about actual cardiac standstill and it is always necessary to have a dose of atropine sulphate ready as an antidote for immediate intravenous use in case of emergency.

Quinidine in continued dosage is useful as a preventative of the seizures. Digitalis has been used similarly but in my experience has been less effectual.

Auricular flutter is a less frequent type of irregularity. It may be paroxysmal or may become established permanently. The ventricle usually beats at rate of 140 to 180 and is characterized by the constancy of its rate. The treatment consists of full prompt digitalization which converts the rhythm to auricular fibrillation almost invariably. Many of the cases spontaneously revert from fibrillation to normal rhythm. It is necessary to continue the digitalis to maintain an efficient rate of fibrillation as long as this arrhythmia persists. Should this time be greatly prolonged, such cases should receive quinidine for conversion to normal rhythm.

The last type of irregularity for our consideration is heart block. This is encountered far less often, but when accompanied by Stokes Adams seizures, it is by far the most dramatic of the lot. This occurs when the ventricular standstill exceeds 15 seconds. Many patients with complete heart block present very little evidence of myocardial insufficiency and are able to lead fairly active lives. Should signs of insufficiency develop, digitalis is to be used as in other cases. The treatment of syncopal attacks is by epinephrine in full cc. doses subcutaneously, which is strikingly efficient. Only rarely is there necessity for intracardiac administration. In patients exhibiting frequent attacks some member of the household should be taught the use of the hypodermic. Ephedrine sulphate in ⅜ grain to ¾ grain doses by mouth given continuously is the most efficient means I have used in preventing the seizures. This drug is strikingly well borne, even in the presence of severe hypertension and some of my patients have received it over five years without difficulty.

Abortion and the Law

Irvin Schermer
Minneapolis, Minnesota

IN Colorado recently a twelve year old girl found that she was about to become a mother as a result of an attack which had been made upon her. Two prominent physicians, recognizing that the child's life and health were both endangered, applied to the court for permission to perform an abortion. The judge ruled that he had no power to authorize such an act, but advised them to proceed since the state law permitted abortion under their diagnosis. The physicians refused to go ahead. They had no assurance of freedom from prosecution in case the child died.

In men who had sworn to uphold the high ideals of their profession this may have seemed cowardly. But they knew it was no small matter to be found guilty of abortion. The statutes of most of our states sentence any person who performs an abortion not sanctioned by the law to serve from one to ten years in the penitentiary. *If the mother dies, he is guilty of murder in the second degree.* Small wonder the doctors hesitated to entrust themselves to the quixotism of the law.

Added to this is the fact that a physician's good faith and his honest belief that an abortion is imperative is no defense. The gist of the crime is the intent to perform an abortion other than that provided for by our legislatures. Purity of motive has been held no excuse in dozens of supreme court decisions.

Blame for the tragedy and sordidness of the abortion picture in this country has been laid on many doorsteps, but to the minds of most lawyers, especially those with medical training, the chief responsibility for the picture rests on the laws against abortion.

The average physician will generally tell you that our statutes allow therapeutic (legal) abortion whenever the mother's life, health, hearing, or eyesight is in danger. But if he were to examine the statutes of the forty-eight states, he would soon discover how blissful was his ignorance. In more than thirty states legal abortion is absolutely prohibited except where continuance of the pregnancy will jeopardize the mother's life. No other exception is allowed. In eight more states the statutes seem to be just about as strict. In only three states—Colorado, Maryland, and New Mexico—is abortion permitted both where the mother's life and her health are in serious danger.

Most generous of all under her present statute is Mississippi. But quicksand rests beneath her liberality. Her statute originally stated that all abortions were prohibited except to save the life of the mother, and when induced on the advice of a physician. A proofreader erred and the words "unless the same shall be necessary to preserve the life of the mother" were omitted. It is doubtful whether the supreme court of the state of Mississippi will allow itself to be influenced by the error.

Some misguided legislatures through an over-exercise of zeal or an ignorance of the meaning of the phrase have actually gone so far as to expressly prohibit "premature deliveries." This literally means that in Alabama, South Carolina, and Louisiana a physician who delivers any child before the normal period of pregnancy is over is guilty of abortion. Evidently overlooked was the fact that by abortion in the legal sense is meant the severance of the fetus from the mother before it is capable of independent existence. In *United States v. Hoffman*, therefore, the court sustained a conviction even though the child was born alive and in perfect health.

Are abortion statutes which can not be enforced of any value? Legislatures have been silent on this point. But it is particularly significant that abortion convictions during the last fifty years have been almost non-existent. Over a period of a half century Alabama has had only five. Utah from 1896 to 1932 has had but one. Michigan and North Dakota from 1921 to 1932 have both had nine. Iowa had only one conviction from 1927 to 1932, while Minnesota has averaged about one conviction a year since the turn of the century.

Any number of district attorneys and law enforcement officials have said that the scarcity of convictions is mainly due to the unwillingness of witnesses to testify. And even if the state does somehow manage to build up a case, get a couple of women on the jury and all is lost for the prosecution.

In contrast to the paucity of convictions is the extent of the practice. Medical authorities have fixed the annual number of abortions in America at from one to three millions per year. It is estimated that the city of Chicago alone accounts for one hundred thousand every year.

Although it is hard to see just what good the present system of crude abortion law has accomplished, its evils rise to smite the eye. More than 8,000 mothers die in agony each year because of the unskilled and unhygienic hands they must seek to avoid a law that was supposedly created for their benefit. The whole underground movement of abortion with its butchering quacks, midwives and incompetent doctors is the result of these statutes now in force.

Given even ideal hospital conditions, an abortion is more dangerous to a woman than normal childbirth, since an exposed pregnant uterus is particularly susceptible to infection. Add to this the poorly lighted back room of some doctor's office, a minimum number of sterilizing instruments, inadequate facilities for safe anesthesia, and a lack of highly important postoperative care, and then you may gather what a theatre of death is created by remorseless human laws.

It is too bad that American judges are not as outspoken as the English Justice McCardie. Some ten years ago in charging a prisoner guilty of abortion, he said:

"You are charged under an act that was passed seventy-five years ago. Since then the national point of view has been greatly changed . . . the law of abortion should be amended. The law as it stands at present does more harm than good. . . . Very often mentally defective women or girls become pregnant either by another mental defective or by a normal man. . . . Those who allow such a child to be born are, in my opinion, guilty of a grave moral crime . . . miscarriages in such cases should be made compulsory.

"I need not deal today with the numerous cases where women are utterly exhausted and worn out with child bearing, nor where exceptional cases may render the birth of a child undesirable. The question of . . . an amendment of the law of abortion must be looked at free from prejudice, whether theological or otherwise. . . . The risk of abortion, if performed with proper surgical skill, is slight."

The British judge was correct about the risk of abortion. In the United States today we have one death for every seventy-five abortion operations. In Russia where abortion is legalized and under government control there is only one death for every 20,000 operations. There is no doubt that with the prevailing standard of medical skill in our own country and a humanizing of our present law, we could better the Russian record.

About three years ago both the British and American legal and medical public was greatly stirred by the trial for abortion of Dr. Aleck W. Bourne, one of London's foremost obstetricians and gynecologists. He had been indicted for performing an abortion on a fifteen year old girl who became pregnant as a result of being raped by three soldiers.

The English rules were as strict as those in America. Angered by the barbarity of laws that denied him the right to operate when he felt that medical ethics justified the act, he decided to make a test case out of the situation. His determination to do so, he testified, had been aroused in 1935 when he performed a similar operation and a house surgeon had refused to assist him. Immediately after the instant abortion, he went to a Scotland Yard inspector and asked to be arrested.

On trial Dr. Bourne offered strenuous arguments for a liberalization of the law so as to bring it into general harmony with medical opinion. He attacked the injustice of legislation that placed a strait-jacket about instances in which a physician could perform an abortion legally. A doctor should be free to operate when he felt the situation demanded the abortion.

In handing down his decision the justice expanded the law to the farthest in English history. Only three American states have done the same. Not only could a physician now operate where it meant the saving of a mother's life, but where it was obvious that childbearing would turn her into a physical wreck.

What the humanizing effect of the English decision will be on our other thirty-odd states is questionable. It is obvious that a reëxamination of the rationale underlying our laws is a necessity. The laws were passed with definite objectives—to safeguard the morals of unmarried people, prevent population decreases, and save the lives of mothers. Instead we find unmarried people resorting to contraceptives and a birthrate unaffected, since no decrease in abortion has been accomplished. As for the saving of mother's lives—the picture of deaths from abortion in America is a reproach to a civilized nation.

Moreover, the law does not take into account the fact that the largest number of abortions are those performed on married women worn out with childbearing or unable to stand the expense of another child. Nor does it take into consideration the tragedies which occur in cases of pregnancy resulting from rape, incest, or the copulation of imbeciles. What about the dilemma of a woman whose husband dies or deserts her shortly after she becomes pregnant?

Cataloging the situations in which physicians may perform abortions will be a helpful, but not complete solution. There must be room for a doctor's honest discretion—flexibility is needed. Only completely legalized abortion can untangle the unhappy mess that seventy-five years of blind and inhuman legislation has created.

Disappearance of Tuberculous Lesions*

Arthur T. Laird, M.D.
Nopeming, Minnesota

THAT the healing of lesions caused by tuberculosis is nearly always the result of fibrosis and calcification is a rather general impression. The complete resolution of definitely tuberculous tissue is considered, if not impossible, extremely rare and limited to exceptional clinical types. Most men would be skeptical as regards the disappearance in this way of caseous tuberculosis. Replacement by fibrous tissue which later becomes calcified or even converted into bone or else remains as a fibrous scar is usually considered the inevitable course if healing occurs.

Yet complete disappearance of tuberculous lesions is not rare and doubtless all of you have known of instances in which it has occurred. My attention was especially called to the fact during a visit with the late Dr. D. A. Stewart of Manitoba in the summer of 1924. He was a believer in the value of prolonged rest in the treatment of pulmonary tuberculosis and it was not at all unusual for his patients with extensive lesions to remain in the sanatorium for three or four years, most of the time in bed. Collapse therapy was not used as extensively then as today and I am greatly impressed by the clearing of pulmonary lesions shown in X-rays by many of his patients.

A little later, in 1928, my friend, Dr. E. Z. Shapiro of Duluth, after visiting Dr. Marc Jacquerod in Leysin, Switzerland, secured a copy of his monograph published in 1926 on "The Natural Processes of Healing in Pulmonary Tuberculosis,"[1] which he very kindly presented to me. In it are illustrations of the same type of clearing Stewart had demonstrated.

In this monograph, reference was made to a paper on "Healing by Resolution in Experimental Pulmonary Tuberculosis" by Dr. Leroy U. Gardner[2] of Saranac Lake which was published in the *American Review of Tuberculosis* for May, 1922. Gardner's concluding paragraph was:

"Thus it has been demonstrated that caseous tubercle can heal by resolution. That the animals were once infected is beyond doubt, for they have all reacted to an intradermic tuberculin test; that the lesions have not been missed in the choice of blocks is shown by the large number of sections selected from the same animal, with the aid of a hand lens. Moreover at the height of the disease the pleura is studded everywhere with tubercles a millimeter in diameter. As time progresses these lesions shrink in size, become fewer and finally disappear completely."

A recent letter from Dr. Gardner indicates that he still believes in the occurrence of such resolution of tuberculous lesions.

In an editorial in the same number of the *American Review of Tuberculosis* (May 1922), Allan K. Krause[3] says, "That healed tubercle does frequently grave a permanent record in once infected tissue is sound pathological doctrine, but that it always does so is not borne out by the facts, clinical or experimental.

"The well-known observations of surgeons on the later history of patients 'explored' for tuberculous peritonitis have lost their rarity," he says. "Scores have performed a second laparotomy on patients to find perfectly smooth and normal peritoneal surfaces where discrete, miliary tubercles studded their surfaces only a few months or several years before.

"It is, of course, conceivable that the anatomic changes of tuberculosis may subside and yet leave a microscopic scar. If such occur, they are for practical purposes in many instances of no more importance than if they were nonexistent."

According to Goldberg,[4] considerable attention has been devoted to the question of the healing of tuberculous bowel lesions. Tuberculous ulceration of the bowels shows a distinct tendency to healing as demonstrated by the formation of connective tissue and scars. Where the lesion has been superficial, healing without scarring may result.

Ornstein and Ulmar[5] quote Rich and McCordock[6] as saying the miliary tuberculous lesions in the lungs may be of a hard or soft type, the former being largely productive and probably produced by the same factors that are accountable for the chronic productive form of tuberculosis, that is, small dosage and low sensitivity. These cause a predominantly proliferative response with comparatively little exudation or caseation. The soft form is the result of a moderate or large dosage on very allergic soil. Like other previously discussed exudative reactions, if the dosage is comparatively small, no permanent damage may be visualized. The whole affair may heal by resolution and leave practically no trace.

These are but a few indications of the fundamental tendency of tuberculous lesions to heal, or in other words, of the ability of the body forces to control the disease if given a chance. A little less exposure to tubercle bacilli in the first place, a little more rest, a little more mechanical help in the form of collapse therapy, a little encouragement or inducement to the patient to want to fight, possibly a better understanding of the relationship between the vagus and the sympathetic nervous system, and before long, we hope, a little help from chemotherapy, then even fairly extensive lesions may more often completely disappear. Such things happen in syphilis—why not in tuberculosis?

It would, however, be a serious mistake to assume that such complete disappearance and resolution of tuberculous lesions is very common or can be expected to occur in very many cases. To delay long the use of pneumothorax or other forms of collapse therapy expecting that resolution would be secured by the other therapeutic measures now at our disposal would certainly be unwise. The development of a cavity in an area of tuberculous infiltration is of bad prognostic import for one rarely disappears without the use of more vigorous measures than simple rest in bed.

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*Presented before the Duluth Society of Internal Medicine, May 8, 1941.

The following cases are presented not as an argument for omitting collapse therapy but to emphasize the fact that with proper encouragement and assistance by collapse therapy and other means, natural tendencies in tuberculosis will often accomplish much more than at first seems possible.

CASE REPORTS

Pulmonary Lesions

CASE I (2399)

March 12, 1926—The patient, age 21, was admitted to Nopeming Sanatorium with a positive sputum.

March 16, 1926—Roentgenographs showed a gross tuberculous lesion involving the greater part of the left lung and minimal lesions in the second interspace on right.

May 31, 1926—Roentgenographs showed the same condition.

June 11, 1926—Pneumothorax was started on left side.

July 7, 1926—The sputum became negative.

July 12, 1926—Roentgenographs showed a partial collapse of the left lung with adhesions opposite the second rib.

Sept. 3, 1926—Cavities on the left were not compressed.

March 25, 1927—Pneumothorax was abandoned.

Sept. 28, 1927—A further clearing of shadows was demonstrable in the upper left lobe in the roentgenograph.

Dec. 2, 1930—The right lung was negative. The left lung showed light grade fibrosis from the apex to the second rib.

Dec. 3, 1940—The right lung was negative. The left showed minimal fibrosis in the left apex.

1942—The patient has been well and working for ten years.

CASE II (3574)

Jan. 2, 1934—The patient, a woman aged 24, was roentgenographed; a negative chest was found.

July 26, 1934—Examination showed a positive sputum.

July 31, 1934—The phrenic was crushed on the left side. There was no other collapse therapy.

July 31, 1934—Involvement of lower left lobe was found with cavity about 5 cm. in diameter.

Sept. 15, 1934—The patient was admitted to Nopeming Sanatorium.

Sept. 26, 1934—The sputum became negative.

Nov. 27, 1934—The cavity was found to be much reduced in size.

Feb. 2, 1935—The area of cavitation had become apparently closed.

July 7, 1939—A minimal fibroid infiltration had remained in the lower left lung.

Nov. 17, 1940—Very little change was noted.

June 15, 1936—The patient was discharged; subsequently there has been an uneventful pregnancy. The patient has felt well up to the present time.

CASE III (20762)

Nov. 23, 1940—The patient, a woman aged 23, was admitted to Nopeming Sanatorium.

Nov. 25, 1940—The Mantoux test was 4 plus. The roentgenograph at this time showed a soft type infiltration upon the upper half of the right lung field. In the first interspace was a cavity 1 cm. in diameter.

Nov. 29, 1940—The sputum was positive, by animal inoculation with gastric contents.

Jan. 9, 1941—The small cavity in the first interspace had disappeared.

May 28, 1941—Only a minimal infiltration, apparently fibroid, was seen in the right apex.

June 3, 1941—The patient's discharge was under consideration at this time. Pneumothorax had been attempted with this patient, but the pleura was found to be thickened with no pleural space to be found. The only symptom persisting on April 9, 1941, had been a slight elevation of temperature.

CASE IV (20211)

April 7, 1939—The patient, a woman aged 26, reported with a loss of weight, a history of pleurisy on the right side, and a pulse of 100 to 110. The tuberculin test was 3 plus. The sputum was (and has remained) negative to all tests.

July 22, 1940—Roentgenographs showed a haziness of the right upper lobe; four or five small cavities were visible in the central portion of the lesion. The right hilum was exaggerated.

Aug. 1, 1940—The patient was hospitalized at Nopeming.

Aug. 2, 1940—The right lung revealed an infiltration extending from the apex to the level of the third rib anteriorly consisting of a pneumonic type of involvement. In the second interspace, there was an area suggestive of cavitation.

Aug. 14, 1940—There was a definite clearing of the pathology in the right lung, particularly in the second interspace where the area of the questionable cavity had disappeared.

June 24, 1941—There was slight but further clearing of the minimal lesion in the first interspace on the left. The right side appeared entirely negative. It is to be noted that the massive pneumonic or atelectatic shadow seen in an earlier roentgenograph had disappeared. The general condition of the patient was favorable at this time. She had been placed on exercise. The only treatment had been rest and hygiene.

Intestinal Lesions

CASE I (2973)

July 16, 1929—The patient, a girl of 15, was admitted to Nopeming Sanatorium with a diagnosis of far advanced pulmonary tuberculosis, tuberculous peritonitis, and tuberculosis of the left knee. The sputum was (and has remained) negative.

July 19, 1929—Roentgenographs of the chest showed a band of increased density on the left side extending from the hilus paralleling the second rib and ending in a softened area at the periphery. In the lower lobe, there was a similar area of increased density. Throughout both lungs was a fine diffuse mottling. Soon after admission to the hospital, the patient had severe abdominal distress with vomiting that was fecal in character. A laparotomy was performed by Dr. B. F. Davis. A generalized tuberculosis was found with a large mass along the mesentery. No uninvolved bowel was found to permit anastomosis. The abdomen was closed with a catheter placed in a loop of gut for drainage.

Sept. 5, 1930—The patient had gained 43 pounds with her condition greatly improved. There was no drainage.

June 6, 1931—The patient underwent a resection of the right knee, which had been swollen. The synovial fluid contained tubercle bacilli.

August 15, 1936—Roentgenographs of the chest showed a minimal amount of fibrosis and calcification in the left apex.

August 30, 1936—The patient was discharged in good general condition, on high exercise, with all lesions "arrested".

CASE II (3712)

Sept. 3, 1935—The patient, a man of 22, was roentgenographed. Extensive tuberculosis involving the upper half of the right lung was discovered.

Sept. 5, 1935—The sputum examination was positive.

Sept. 7, 1935—Pneumothorax was instituted.

Oct. 4, 1935—Pneumothorax became complicated with a purulent pleural effusion.

Nov. 2, 1935—The patient was admitted for hospitalization at Nopeming.

July 15, 1936—Roentgenograph G.I. series showed a moderate spasticity of the large bowel.

Dec. 17, 1936—The sputum became negative after this time.

Dec. 30, 1936—Roentgenograph G.I. series were interpreted as showing a definite tuberculosis of the cecum and the ascending colon.

Dec. 7, 1937—Thoracoplasty done in two stages (the second on Jan. 20, 1938) for tuberculous empyema of the right side.

March 7, 1938—A laparotomy showed a large perforated tuberculous ulcer of the cecum as well as extensive tuberculosis of the bowel with peritonitis. Ileostomy was performed and the tuberculous lesion brought out to the surface.

Jan. 1, 1940—A closure of the ileostomy was made by Dr. Strobel. Following the incision, the bowel was freed and the ileum closed. The omentum was brought over this and fastened. The hernia was repaired. There was no evidence of any tuberculosis of the bowel or peritoneum.

Jan. 30, 1940—The pulmonary condition was diagnosed as "arrested by thoracoplasty." The patient was discharged.

Feb. 1, 1940—The colostomy had closed, with bowel movements normal and no evidence of obstruction of the intestinal tract.

March 25, 1941—The patient, weight 166 pounds, was at home; he looked and felt well and was ready for work.

CASE III (3963)

April 4, 1938—The patient, a man of 32, was admitted to Nopeming. The sputum was positive.

April 28, 1938—Roentgenographs showed massive bilateral tuberculosis.

July 22, 1938—Massive bilateral tuberculosis still evident in the roentgenograph, but with a cavity 5 cm. in diameter now apparent in the left apex.

Sept. 6, 1938—Roentgenographs, G.I. series, barium enema, revealed ulcerative and proliferative tuberculosis involving the terminal ileum, cecum, and the ascending colon.

Oct. 24, 1938—The patient's clinical condition had become worse, with nausea, occasional vomiting and loose stools during the preceding month.

Feb. 1, 1940—Roentgenographs, G.I. series, barium enema, were interpreted as showing ulcerative and proliferative tuberculos's which had undergone a marked improvement since Dec. 3, 1938.

May 2, 1940—The sputum examination was negative.

May 9, 1940—Roentgenographs, G.I. series, disclosed that the evidence of pathology which had been previously so marked had almost disappeared.

April 29, 1941—The patient was discharged.

June 28, 1941—Examined at this time at home, the patient's weight was 193 pounds. He felt well and was considering training for a trade.

CASE IV (2827)

June 3, 1928—The patient, a boy of 10, was admitted to St. Mary's Hospital with possible miliary tuberculosis of the lungs.

July 3, 1928—Roentgenographs showed an increase of the right hilus shadow extending toward the apex.

July 10, 1928—A second roentgenographic examination revealed the same findings and in addition a "seeding" of both lungs suggesting miliary tuberculosis.

July 11, 1928—The Mantoux test was positive.

Oct. 4, 1928—Miliary mottling was still present in the roentgenograph.

Oct. 10, 1928—Sputum was positive.

Oct. 25, 1928—The patient was admitted to Nopeming Sanatorium.

Oct. 28, 1928—Roentgenographs showed a diffuse mottling on both sides of the chest.

Feb. 21, 1929—Roentgenographs showed a decided clearing of miliary shadows.

March, 1929—Still febrile, with a frequent temperature of 100°, the patient had gained 9 pounds.

April, 1930—The Mantoux test was 3 plus.

May, 1930—Roentgenographs showed a clearing of the hilus region.

Dec., 1931—The patient became nauseated, with vomiting, diarrhea, and blood in his urine.

Dec. 28, 1931—The patient died. The autopsy revealed only a few tubercles, 0.1 cm. in diameter or smaller, scattered throughout the lung tissue. On microscopic examination, these were found to be tuberculous. Extensive infiltration with typical tuberculous granulation tissue was found in the kidneys.

REFERENCES

1. Jacquerod, Marc: The natural processes of healing in pulmonary tuberculosis; London, Bailliere, Tindall, and Cox, 1926.

2. Gardner, Leroy U.: Healing by resolution in experimental pulmonary tuberculosis, Amer. Rev. Tuberc. 6:163, 1922.

3. Krause, Allan K.: The healing and disappearance of tubercle (editorial), Am. Rev. Tuberc. 6:238, 1922.

4. Goldberg, Benjamin: Tuberculous enterocolitis, Clinical Tuberculosis 2:17; Philadelphia, F. A. Davis Co., 1935.

5. Ornstein, George G., and Ulmar, David: Hematogenous tuberculosis, Goldberg's Clinical Tuberculosis 2:3; Philadelphia, F. A. Davis Co., 1935.

6. Rich, Arnold, and McCordock, H. H.: Bull. Johns Hopk. Hosp. XLIV (May) 1929.

Fractures of the Mandible

With Special Reference to the Reduction of Complicated Displacements and Subsequent Immobilization

Carl W. Waldron, M.D., D.D.S., F.A.C.S.
Minneapolis, Minnesota

AUTOMOBILE accidents of the past quarter century have resulted in a greatly increased number of severe injuries of the face and jaws. This is particularly true of fractures of the upper jaw, which formerly were quite rare. When collisions occur, the high speed of modern cars results in great violence of impact of the face against the instrument panel, the doors, or the back of the driver's seat. This accounts for the frequency of multiple fracturing of the facial bones and the marked displacement of fragments frequently seen in fractures of the mandible and the maxilla to involve the sinuses, the orbits, and the malar zygomatic compound. Malar fractures are common and may present extreme variations of displacement in almost any direction. In fractures of the upper jaw, there may be a degree of impaction present which offers considerable resistance to the efforts made to correct the displacement and restore the normal occlusion of the teeth. Multiple fractures of both upper and lower jaws in the same individual are not uncommon. These cases often present difficult problems in the technic of the reduction of displacements and the subsequent immobilization of the fragments in order to secure the restoration of normal occlusion. It may be very difficult to visualize the dental occlusion as it was before the accident, and impressions of the teeth, from which study casts are made, are often of great value in the successful handling of the case.

Moderate degrees of irregularities and malocclusion of the teeth are seen so frequently among the adult population that multiple fractures of the jaws may well occur in such individuals. In these cases, the diagnosis of the degree and nature of the displacements, and the correction necessary to restore the occlusion may present great difficulties. This is sufficient reason for making study casts of the teeth in all fracture cases where manipulation to an obviously correct occlusion cannot readily be secured. Such casts are useful in determining the nature of the displacements and the plan of treatment. Should the simpler methods of wiring prove ineffective, the casts may be duplicated and used for the construction of suitable dental splints. As already noted, the directions and forces of the impact are important factors in the resulting displacements. These are further modified by the direction of the lines of the fractures in both the antero-posterior and bucco-lingual planes. These fracture planes, in turn, have an important aggravating or reducing influence upon the displacements caused by the contraction or spasm of the muscles that are attached to the fragments.

In fractures of the body of the mandible which extend in a backward direction to the lower border of the jaw, the posterior fragment tends to be displaced upwards and forwards by the elevator muscles unless an occluding tooth in the posterior fragment prevents such an elevation. In the bucco-lingual plane, the fracture lines may be very oblique, presenting a fracture through the buccal plate that is a centimeter or more further forward than the line of fracture through the lingual plate. This favors buccal displacement of the posterior fragment. When occasionally the reverse condition is present, the tendency is for an overriding lingual displacement of the posterior fragment. The fractured surfaces of the bone may often present irregularities that tend to engage each other and prevent recurrence of displacement when reduction is complete and immobilization is secure. Such surface irregularities may, however, interfere with the sliding past of a displaced fragment when an attempt is made to gradually correct the displacement by oblique tie wire traction or rubber band traction. These methods are of great service in cases when there has been delay in treatment and malunion is progressing in a slightly displaced position. In recent fractures, however, should the tightening of oblique tie wires or the use of rubber band traction fail to reduce the displacement and to correct the occlusion in twenty-four hours, I feel that digital manipulation should be undertaken at once. During the past year or two, I have been impressed by the advantages of carefully diagnosing the planes of the fracture lines and the factors that contribute to the difficulties encountered in reducing marked displacements. Such a careful examination and study will enable the surgeon to quickly determine the plan of treatment to be instituted.

The next procedure is the preliminary wiring or the application of arch bars, modified orthodontic appliances or splints designed to hold the fracture in correct alignment after the manual reduction is carried out. This is accomplished by carefully applied traction and manipulation to slightly separate and disengage the fragments and then bring them into correct alignment. The fractured surfaces are carefully held in position while the dental fracture wiring is completed or the splints or other appliances are adjusted. Fortunately this method of manual reduction is also successful in many of the fractures just distal to the third molar tooth in which there is marked displacement of the posterior fragment. The anterior fragment is immobilized in its normal position by indirect dental fixation, whereby the teeth in the mandible are securely wired in correct occlusion to the upper teeth, the latter serving as a splint. The posterior fragment is not fixed to the anterior fragment by any wiring or appliance, but is merely steadied by the correct apposition of the fractured surfaces which tend to engage each other. Some splint-like support by the masseter and internal pterygoid muscles aids in the steadying of the posterior fragment, and the progressive reparative processes in the previously torn periosteum gives increasing support. When, however, the planes of the fracture are oblique from above downward and backward to the lower border and from the buccal plate inward and backward to the lingual surface with marked initial displacement, it may be necessary to employ some method of external surgical fixation. Screws or pins attached to an extra-oral appliance or the application of a traction wire to the posterior fragment such as Darcissac's method may be used to secure the displaced fragment in a relatively normal position.

Several articles on the treatment of fractures of the jaws have appeared during recent years advocating methods of incomplete immobilization to deliberately permit "slight movement" at the site of the fracture "which materially aids in repair."[1] Statements such as "any fracture held in anatomic alignment and held with slight movement will repair more rapidly than one completely immobilized"[2] and that "the general surgeon has proved the advantage of a slight amount of motion at the site of fracture" are not based upon the accumulated clinical experience of the orthopedic surgeons or the extensive research on bone regeneration and repair. Every effort is made by the orthopedic surgeon to securely immobilize the fractured surfaces of bone in contact with each other. This is an established principle of fracture surgery of long proven value, and one should hesitate to make any departure from it. Modern advances in fracture therapy have been directed towards improving the circulation and nutrition of the tissues and muscles in the region of the fracture by means of massage, physiotherapy and passive and active motion under skilled supervision to assure subsequent unimpaired function of nearby joints. These important additions to the treatment of fractures are carried out with extreme care to avoid any movement at the site of fracture. I am convinced that oral surgeons advocating slight movement at the line of fracture have misinterpreted and misapplied the principles of treatment employed by surgeons in the treatment of fractures of long bones. Furthermore, most fractures of the mandible are compounded into the oral cavity along the root surface of a tooth. It is essential that reinfection of the deeper portions of the line of fracture through the periodontal space along the surface of the root be prevented, as far as possible, by as nearly complete immobilization of the fractured surfaces as may be secured. It is, of course, a fact that undiagnosed compound fractures of the lower jaw may unite firmly without having been treated or immobilized. Such fractures, however, are usually linear in type without mobility, displacement, or tearing of the periosteum. The communication with the oral cavity along the root of the tooth in the line of fracture may have been, however, but very slight and perhaps sealed by the initial hemorrhage. I have seen a number of patients with this type of fracture a month or more after the time of injury. All have sought treatment because of pain, persistent swelling, tenderness, low grade infection, or abscess formation. These complications very rarely occur when such fractures are promptly put at complete rest by wiring the teeth in occlusion for a period of three weeks or more.

It is a common experience to find excessive swelling, pain, abscess formation, and delayed union in cases where the original interdental wiring was not applied for several days and had not been sufficiently secure, or when tie wires become stretched or broken, permitting slight movement at the site of fracture. Many patients have told us that they feel more comfortable when the wiring is tight and secure and are glad to have the tie wires tightened if they become stretched.

The Repair of Fractures—General Considerations

Recent histologic researches by Urist and McLean[3] regarding the processes of repair of fractured bone demonstrate the prompt reaction to injury, and the early institution of the organization and beginning calcification of the reparative tissues. The typical course of the healing of fractures is briefly summarized: "The first reaction to the injury is essentially a sterile inflammation, which is the consequence of trauma and hemorrhage. Four to eight hours after the bone is broken, the defect is filled and surrounded by extravasated blood, hemorrhagic debris, and inflammatory exudate, including leukocytes. After twenty-four hours there is reparative new formation of connective tissue, which is at first ordinary granulation tissue, in the sense of Marchand, but which continues to proliferate, and to form dense fibrous connective tissue. A part of this differentiates further to form hyaline cartilage and fibrocartilage and a part remains undifferentiated. The new tissue, as a whole, is here called the fibrocartilaginous callus."

"At the time these changes are taking place in and near the defect in the bone, formation of new bone begins under the periosteum and endosteum, at some distance from the fracture line. This new bone invades and replaces the fibrocartilaginous callus, and leads to bony union (in the rat) at about the twenty-fourth day. Whether or not cells arising from the ordinary connective tissue of the callus have osteogenic potencies, cells arising from the deep or cambium layer of the periosteum, and from the endosteum, play the greatest part in the production of new bone. Repair of fractures depends upon a variety of cells and of reparative processes, with, as will be seen, considerable variation in detail in the manner in which calcified bone is produced. The process as a whole is an excellent example of organization by diverse means to a common end,—in this case, the healing of the fracture by bony union."

It seems logical to conclude that these processes in human beings are similar and that they will function more rapidly and more satisfactorily when a displaced compound fracture of the mandible is promptly reduced and put at complete rest. One cannot, of course, specifically interpret human fracture reparative processes on the basis of animal experimentation, for union of fractures in animals is the rule in spite of lack of immobilization other than a variable amount of rest given to the fractured bone by the animal.

One hesitates to question the use of rubber band traction in fracture cases for the routine fixation of the teeth of the mandible in occlusion, realizing that in the hands of many experts[1,2] the mandible is completely immobilized by this method. The problem, however, is whether physicians or dentists in any part of the country who may be called upon to treat fractures of the mandible will secure as efficient immobilization by rubber bands as they would by the use of tie wires. The histological researches in the processes of healing of fractures and clinical experience have convinced me that during the first three or four weeks, while bony repair is becoming established, fractures of the mandible are best secured in occlusion by tie wires (figs. 1 and 3). Twisted loop unit wiring and the Risdon[7] external arch wiring (fig. 2) are very useful methods. Following this period, in uncomplicated cases, patients who fully coöperate may have the tie wires removed, and rubber bands substituted (fig. 4). At this stage, after three or four weeks of bone repair, there is usually little tendency for displacement, and slight motion may then tend to accelerate the bony consolidation according to Wolf's Law.

Lest I be misunderstood, I wish to state that I am in full agreement with the recently published *Lectures on Military Dentistry*[4] that the teeth should not be wired in occlusion in severely injured patients previous to their transportation to the hospital. Recurrence of hemorrhage, swelling, exudates, nausea, and vomiting may result in acute respiratory obstruction and death, or subsequent pulmonary infection. Rubber bands are safer than tie wires until the patient is admitted to the hospital.

It is indeed fortunate that untreated or poorly treated fractures of the mandible of several week's duration with incomplete union, displacement and malocclusion may usually be successfully reduced and union secured by rubber band traction alone, or combined with interdental wiring.

It is not the purpose of this paper to enter into controversy regarding the relative merits of various splints, appliances, or systems of wiring, but rather to present relatively simple methods that have been found useful in reducing and securing badly displaced fragments. Prompt reduction and immobilization of mandibular fractures reduce the incidence of infection and are the best means of preventing complications. Individuals and circumstances so alter cases that no fixed rules can be instituted. The orthodontist who is called upon to treat fractures, can, of course, apply his special technics most effectively in the majority of cases.[5,6] The oral surgeon will be more at home with simpler methods of wiring—arch bars, etc., and the prosthetic dentist will have the advantage, in cases where splints are necessary. The efficiency and speed of available dental laboratory services are factors to be considered in the selection of the method of treatment. During World War I, very efficient coöperative team work was developed by the oral and plastic surgeon, the dental surgeon, and his associated dental laboratory services. Cast metal splints cemented to the teeth were found to be the most efficient because of their greater strength and security and the necessity of sending many patients on leave, away from skilled supervision in order to make room for acute casualties from the combat area. In well organized maxillo-facial surgical centers, dental splints could be constructed and inserted in less than forty-eight hours. The experience of the past twenty years convinces me, however, that had continued supervision by the maxillo-facial teams been possible, a large proportion of the soldiers with fractures of the jaws could have been cared for more promptly, and possibly more efficiently, by interdental wiring than by the methods of splinting that we used.

It has been estimated that 90 per cent of the fractures of the mandible and maxilla can be efficiently treated by one or other of the standardized methods of wiring. This is fortunate, for such patients must be cared for in all parts of the country by physicians and dentists far removed from large cities where there are specialists with extensive experience in this work.

It is theoretically true that well constructed mandibular dental splints provide somewhat better direct dental fixation for Class I fractures of the mandible in which sound teeth are present on both sides of the line of fracture. Patients who coöperate well and are careful in avoiding food that requires mastication, may, if thus splinted, be permitted to open the mouth and use the jaws to some extent. From a practical standpoint, however, one must consider the fact that injuries frequently produce multiple fractures, one or more of which involves the retro-molar region, angle, or ramus, Class II, to necessitate the immobilization of the teeth in occlusion, unless an effective extra-oral pin or screw appliance is used. Consequently, the employment of wiring methods rather than mandibular dental splints as a routine method is preferable on account of the simplicity of application, and the fact that the occlusion of the teeth is not hidden from view, although this drawback is avoided by open occlusion splints such as the United States Dental Corps combination splints made of clear acrylic resin or cast metal.[4] Many articles have been published during recent years on the subject of fractures of the jaws, and valuable additions to the sum total of useful methods and appliances have been made available. It is greatly to be regretted that but few authors have stressed the necessity of having at least one surgeon and one dentist in every community who are willing to devote sufficient time to study of the fundamentals of treatment of jaw injuries in order to make sure that individuals of their respective communities may not suffer from lack of adequate care. When the occasional extremely complicated case beyond the experience of the local surgeons and dentists is encountered, arrangements can usually be made to remove the patient to a larger center or to secure the help of a specialist. It is a sad commentary that a considerable number of untreated or inadequately treated cases of average type fractures of the jaw with resulting mal-union, malocclusion, and deformity are seen in spite of the ease with which adequate care may be provided. It is obvious that more time should be devoted to the subject

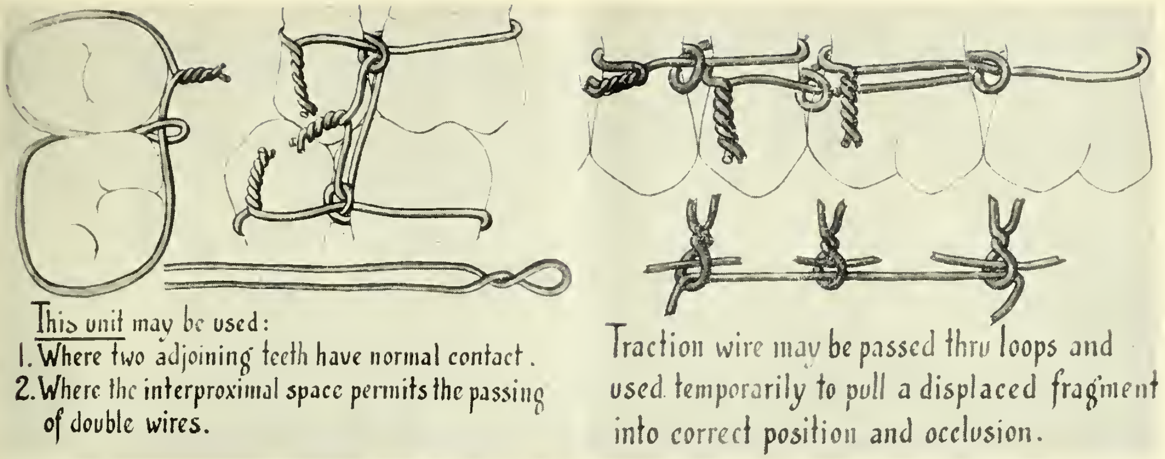
This unit may be used:
1. Where two adjoining teeth have normal contact.
2. Where the interproximal space permits the passing of double wires.
Traction wire may be passed thru loops and used temporarily to pull a displaced fragment into correct position and occlusion.

Fig. 1. Left—Conventional type of loop wiring—a very useful and readily applied method of wiring the teeth in occlusion. Right—Overlapping loop units used to bind three or more teeth together where greater strength is necessary in order to correct the displacement and hold the teeth more securely.

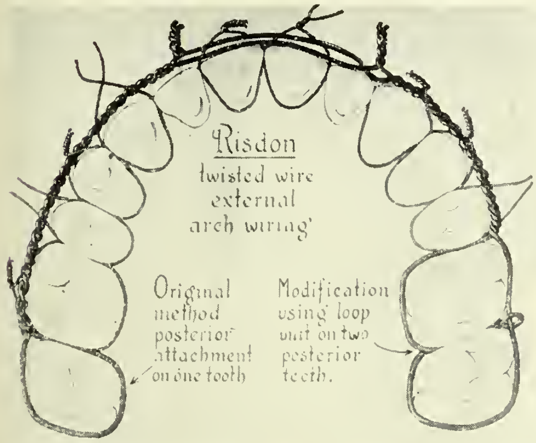
Risdon twisted wire external arch wiring
Original method posterior attachment on one tooth
Modification using loop unit on two posterior teeth.

Fig. 2. Risdon External Twisted Arch wiring is an efficient method of securing direct dental fixation across the line of fracture and provides an arch for the insertion of tie wires to hold the teeth in occlusion. It may be wired to isolated teeth and to a number of teeth that do not present closed contacts so necessary for the successful application of loop units. It is particularly effective in fractures of the mandible.

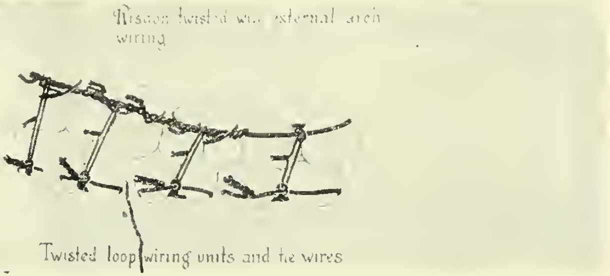
Risdon twisted wire external arch wiring
Twisted loop wiring units and tie wires

Fig. 3. Lateral view of interdental wiring assembly. In the majority of cases of fractures of the mandible, the Risdon wiring would be applied to the lower teeth to provide direct fixation across the line of fracture and loop units or a twisted wire arch would be applied to the upper teeth to provide a means of wiring the teeth in occlusion.

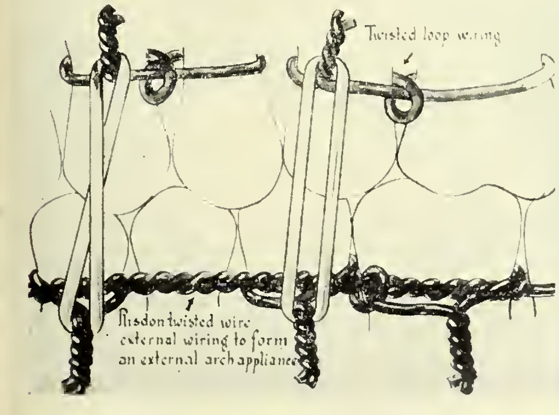
Twisted loop wiring
Risdon twisted wire external wiring to form an external arch appliance

Fig. 4. Rubber band traction may be used for the initial correction of displacement following which they may be replaced by tie wires. Later, when union of the fracture is progressing favorably, tie wires may be removed and rubber bands may be used to secure the teeth in occlusion at night and between meals.

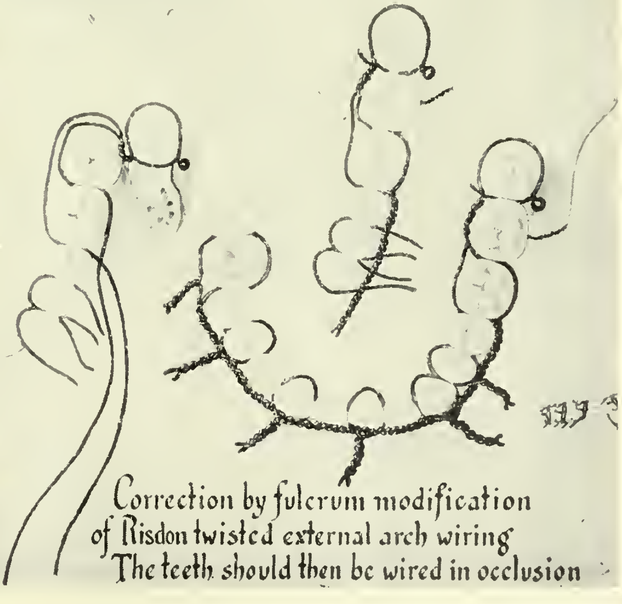
Correction by fulcrum modification of Risdon twisted external arch wiring
The teeth should then be wired in occlusion

Fig. 5. Fulcrum wiring for the correction of an overriding displacement is particularly effective in posterior fractures, Class I, but may be used with success in the cuspid region and symphysis to maintain the correct alignment of the teeth.

in schools of medicine and dentistry, and dental students should be required to do technic work in the commonly used methods of fracture immobilization.

Since the majority of the dentists who might find it necessary to treat fractures have not had a thorough training in this field, surgeons writing on the subject should be careful to give specific details regarding fracture treatments and postoperative care. Too frequently, inexperienced readers misapply such information because of a lack of a complete description of the method.

Compound fractures of the body of the mandible presenting displacements should be treated as soon as possible. The prompt reduction of displacements followed by secure immobilization of the fragments to give complete rest to the injured parts constitutes the best means we have at our disposal for the prevention and control of infection of the bone at the site of fracture. Displacements and overriding tend to open up spaces in the region of the fracture. This permits the entrance of infection, and the recurring movement of the parts tends to further injure and increase the inflammatory reaction of the surrounding soft tissues. Unless necessitated by the general condition of the patient and the presence of other serious injuries, there should be no delay in instituting adequate treatment of the fractured jaw.

X-ray examination is essential and a P-A (postero-anterior) roentgenogram for the facial bones should be made in practically all cases. This projection gives an excellent general survey of the mandible and maxilla. Lateral jaw projection roentgenograms are indicated to secure more accurate details of the areas of the fractures. Regular dental films may be necessary to determine the relation of the roots of teeth to the lines of fractures, and occlusal dental films should be used to determine the bucco-lingual planes of the fractures. Stereoscopic roentgenograms are of great service at times, as are special projections to show the condyle head and neck. However, treatment should not be postponed because of delay in arranging the X-ray examination, for the clinical examination of the patient, and the study of the occlusion are much more important in the diagnosis and handling of most jaw fractures. In a large proportion of cases, X-ray examination before fracture treatment could be omitted without detriment to the patient, and roentgenograms made after reduction and immobilization would actually be more desirable.

OVERRIDING FRACTURES OF THE BODY OF THE MANDIBLE WITH SOUND TEETH ON BOTH SIDES OF THE LINE OF FRACTURE

A very troublesome displacement is one due to an oblique fracture plane extending from the buccal surface distally to the lingual surface which permits external and upward displacement of the posterior fragment. The fracture is usually between the third and second molars or between the second and first molars, but may be further forward in the arch. Effective repositioning of the fragment and tooth distal to the line of fracture to a position in proper alignment and its fixation by routine wiring may be made difficult or impossible by the absence of the upper molars or the lack of sufficient occlusal anatomy to maintain the normal cusp relationships in occlusion. A simple method of fixation of the posterior fragment containing one molar is as follows: a 24 guage brass wire with a soldered loop for later tie wire fixation is passed around the gingival surface of this molar and twisted securely by three or four twists on the mesio-lingual aspect of the tooth. The two ends of the wire are passed on the lingual side of the adjacent molar in the anterior fragment. One wire is then passed from lingual to buccal through the mesial interproximal space of this molar and the other wire is similarly passed through the mesial space of the second tooth anterior to the fracture. When these wires are later tightened and twisted on the buccal surface, the tooth on the anterior fragment adjacent to the fracture becomes a fulcrum around which the molar on the displaced posterior fragment is pulled and retained in normal alignment (fig. 5).

Before completing this reduction and fixation, it is wise to apply the wiring to the teeth of the upper jaw designed to secure the teeth in occlusion. The following method of wiring has been used with success: A modified Risdon twisted external arch wiring[7] is attached to the upper teeth, using a conventional Ivy loop wiring on two adjacent posterior molar teeth as the beginning of the external arch wire (fig. 2). This wire is then securely attached to the teeth by means of short lengths of 24 guage wire passed around every other tooth or around adjacent teeth if the size of the interproximal spaces will permit. This heavier guage wire is used where possible as the twisted ends are sufficiently firm to be used as hooks for the use of rubber band traction a month or so later if it seems wise to substitute them for tie wires. The ends of the twisted arch wire may be attached to the distal tooth on the opposite side by passing one wire around the tooth and twisting it with the other wire.

Short lengths of 24 guage wire are similarly passed around the teeth in the anterior fragment of the mandible with the ends projecting labially. These are used later to attach the twisted arch wire to the teeth for direct dental fixation.

The next step is the reduction and fixation of the fracture. This may require two assistants, one to secure adequate retraction of the cheek and lips while the operator manipulates the posterior fragment into correct position. The second assistant pulls the ends of the first placed fulcrum wire tight on the buccal of the second tooth mesial to the fracture and twists them to secure the fragment. The ends are then twisted for an additional two inches or more to form a Risdon external arch wire which is attached to the lower teeth by means of the previously placed short length wires (fig. 5). The ends of the arch wire are attached to distal teeth on the opposite side in the manner already described, and the teeth are then secured in occlusion by tie wires, as in Figures 1 and 3. Should there be two teeth on the posterior fragment, the initial wiring may be started as an Ivy loop unit with the ends twisted on the mesio-lingual of the tooth next to the line of fracture. The sooner this treatment is undertaken, the better; otherwise, beginning malunion may necessitate surgical division of the reparative tissues before repositioning the posterior fragment is possible.

I first used this method with success in 1936 on a male patient 28 years of age after preliminary conventional wiring had failed to hold the posterior fragment in its proper position. The tie wires were removed in forty-two days and the fulcrum type wiring was left in place to provide direct dental fixation for an additional thirty-six days until bony union was complete.

The method has been since successfully employed in several cases with similar displacements, and in a modified form the fulcrum principle of wiring has been used frequently for the correction of displacements in the bicuspid and anterior regions of the mandible and maxilla. In one child 7 years of age, with similar displacement and mal-union five weeks after injury, the incomplete bony union was divided surgically between the permanent first molar and the deciduous second premolar teeth. The posterior fragment was repositioned and held in correct alignment by the fulcrum arch wiring. The teeth were kept wired in occlusion for six weeks, and the fulcrum direct dental fixation wiring was removed in sixty-six days. Bony union was complete without complications.

In the event the posterior fragment tends to elevate on account of the absence of opposing teeth in the upper jaw, an extension wire of arch bar material or an occlusal splint may be used to hold it down in position.

Overriding Fractures of the Second and Third Molar Regions, Retro-Molar Region, and Angle of the Mandible

Fractures in this region are common, and manual reduction of the displaced posterior fragment combined with the wiring of the teeth of the anterior fragment securely in occlusion will usually be effective if the planes of the fracture line are more or less vertical and transverse. Recurrence of displacement does not tend to occur when irregularities of the fractured surfaces engage each other, and when the planes of the fracture are favorable. By securing the teeth in occlusion by wiring or splints, the masseter and internal pterygoid muscles are put at rest and aid in supporting the posterior fragment.

Should, however, the fracture line be directed downward and backward to the lower border of the mandible and obliquely backward to the lingual surface rather than transversely, marked external, forward, and upward displacement of the posterior fragment is the rule. Treatment by some form of surgical fixation frequently becomes necessary, although a fork-like extension, (fig. 6C), a lug D, or a grooved splint extension from a splint on the teeth of the anterior fragment A, or from the upper posterior teeth B, to support and control the slight amount of alveolar process ridge present on the posterior fragment may suffice in some cases.[9,10,11] These extensions may penetrate the mucous membrane over the posterior fragment to engage the bone in the retro-molar triangle. They may be incorporated in a jack screw arrangement which can be adjusted to push the posterior fragment back to its proper position. Recently, Berry[8] has described a splint with an alignment rod extending posteriorly to which is attached a sleeve that slips over a (fig. 6E) vitallium screw inserted intraorally into the posterior fragment. These methods are shown in Figure 6 as used in fractures situated more anteriorly in which there is a greater amount of alveolar process ridge on the edentulous posterior fragment. They are more effective in such cases. During World War I, attempts were made to hold down the posterior fragment by means of a screw passed beneath the zygomatic arch into the coronoid process. A similar method was the insertion of a nail beneath the zygomatic arch and above the coronoid notch of the mandible.

Direct surgical wiring of the fragments through a submandibular incision to expose the fracture line has been so frequently followed by postoperative infection, necrosis, sequestration and non-union, that this method has been largely abandoned. Such complications may be greatly reduced by maintaining submandibular drainage through a Penrose drain to the fracture line and fixing the anterior fragment securely in occlusion to put the parts completely at rest. If direct surgical wiring is attempted, the fragments should be drilled as close to the lower border and to the fracture line as is possible (fig. 11A). Should sequestration subsequently occur, the bone lost would more likely be limited to a very small section of the lower border.

To overcome the difficulties resulting from surgical wiring across the fracture lines, many methods have been devised to fix the fragments surgically without external incisions that directly expose the fracture. Fixation by vitallium screws or steel pins inserted through the skin into the fragments at a safe distance from the fracture line to which external splints are secured have been found efficient,[12,13] and this method is now being extensively used in England (fig. 7).

I recently used this method with success in a patient with three badly infected, displaced, compound fractures of the mandible of six weeks' duration. The presence of bronchiectasis, lung abscess, and massive pulmonary necrosis had made it impossible to maintain the teeth in occlusion by wiring. The heads of 1¼ inch Venable Vitallium screws were modified (figs. 7A and 8) to fit universal joints (upper unit of No. 56 Starrett surface guage) that we have used frequently in the treatment of fractures of the upper jaw by head appliances. One screw was inserted in the distal fragment near the posterior border and one in the anterior fragment about three centimeters in front of the fracture line which involved the third molar region. The overriding displacement was reduced by manipulation and the universal joints and connecting steel rod were adjusted and immobilized by tightening the thumb nuts. The fragments were held securely by the appliance and union of the fracture progressed without complication or any sign of irritation or infection of the skin or subcutaneous tissues at the sites of the insertion of the screws (fig. 7C). The appliance was removed in twenty-four days. Unfortunately, the pulmonary necrosis extended in spite of energetic medical and surgical treatment, and the patient died three months after his injury.

Another frequently employed method is that of Darcissac in which an incision is made behind the angle of the mandible to expose the posterior border of the ramus. A small hole is drilled above the angle through which a wire is passed to extend through the incision. This in turn is attached to an extension from a headcap (fig. 8A), or to a horizontal extra-oral arm that passes between the lips (fig. 8B), to be fixed by means of a rectangular tube to a universal tube and arch bar splint wired to the teeth, or to a cast metal splint cemented to the teeth in the anterior fragment. This latter fixation is to be preferred to the head cap fixation for the reason that it constitutes a measure of direct fixation of the posterior fragment to the anterior fragment by means of the appliance. In a recently described modification of Darcissac's method,[12] a vitallium screw is inserted through the cheek into the posterior fragment. The horizontal extra-oral arm is welded to a vitallium mandibular splint which is held in occlusion by lock pins to an upper splint. The posterior end of the extra-oral horizontal arm is bent to form a double loop and hook to which may be attached a rubber binder from the vitallium screw. A plate on the extra-oral arm makes it possible to fix the screw to the arm after the displacement has been corrected by the rubber traction.

We have constructed a similar appliance using our standard universal splint with rectangular tubing which is wired to the teeth of the lower jaw. A horizontal extra-oral arm is inserted into the rectangular tubing and wired posteriorly to prevent its slipping forward. To this arm, a universal joint (Starrett tool gauge) is attached which carries a steel rod to which is welded a sleeve which fits over the end of a Berry vitallium screw inserted through the skin into the posterior fragment. This appliance (fig. 8C) is strong, readily adjustable, and when fixed provides efficient secure immobilization. We have this assembly ready for the next case in which this method is indicated.

It must be stressed that these surgical methods must be supplemented by wiring or splinting the teeth in occlusion for five or six weeks or longer in order to give the fractured surfaces the maximum immobilization possible. Many of the surgical methods described are not as strong or secure as could be desired.

DISPLACED FRACTURES OF THE PARTIALLY EDENTULOUS MANDIBLE

Unless the fractured surfaces are so exposed that the direction of the fracture lines are apparent in both vertical and horizontal planes, it is wise to secure roentgenograms in both lateral jaw and occlusal projections. When planes favorable for retention are determined, it is sometimes possible to secure relatively good immobilization of an edentulous posterior fragment by wiring or splinting the teeth of the anterior fragment to the upper teeth or to an upper denture, to be supplemented by external bandaging.

In cases with less favorable planes, some support or control of the alveolar process ridge of the posterior fragment may be obtained by using the patient's partial denture (fig. 9) or constructing an alveolar process saddle splint extending from a splint or appliance attached to the teeth on the anterior fragment or to the posterior teeth of the upper jaw. (See fig. 6, A and B). It may be noted that an alveolar process splint may be constructed to extend to a low level on the lingual surface of the posterior fragment similar to the Fournier denture technic. This provides better stabilization of the fragment which with immobilization of the anterior teeth to the maxilla by interdental wiring or splinting secures both fragments in good position. The tissues usually accept this amount of splint pressure without undue irritation if there is no movement. The use of clear acrylic resins for the construction of splints over alveolar process ridges is a distinct advance in fracture therapy in that this material is transparent and does not interfere with subsequent X-ray examinations. Early extensive swelling of the tissues over the edentulous fragment may make it impossible to use the partial denture or an alveolar process splint.

If the patient has no natural upper teeth, the artificial upper denture must be used to guide the lower anterior teeth into correct occlusion, and external bandaging must be used to hold the mandible up in position. If the upper denture is broken, it should be repaired, or if lost, a splint should be constructed. Often, one is called upon to decide whether to accept a slight displacement of an alveolar process fragment after reduction or to undertake more complicated surgical procedures. The following case report illustrates this point.

A female patient, age 42, was slugged and sustained a compound fracture through the alveolar process of the mandible in the left second molar region. Her only natural teeth were four lower incisors in the anterior fragment which was displaced about one-half inch to the left. The posterior fragment was elevated about one-half inch and there was considerable overriding. After reduction by manipulation, it was found impossible to maintain the incisor teeth in correct occlusion with the upper denture. A cast metal splint was constructed and was cemented to the lower incisors. This carried an extension arm that passed between the lips. Rubber bands were attached to the arm to secure traction to the right and also in an upward direction by means of a Universal type frontal head appliance (fig. 10). The bands were adjusted and maintained in position for two and a half weeks following which there was no tendency for recurrence of the displacement. Extreme swelling made it impossible to use her lower partial denture as a splint. Union of the fracture proceeded without complication, the patient abstaining from masticating solid food for an additional two weeks. Minor adjustments of her lower partial denture and the upper denture were made to accommodate the dentures to the slight upward displacement of the posterior fragment.

Should a process splint prove unsuccessful in controlling the posterior fragment, it may be wired up into the splint by passing a wire around the fragment just outside its periosteum and twisting it over the splint. This method of circumferential extraperiosteal wiring is relatively simple, and is a very useful form of stabilization when indicated. (See figs. 12 and 13). The surgical fixation described for fractures in the retro-molar region employing vitallium screws and splints either intraorally or extraorally may be used if necessary. (See figs. 7 and 8).

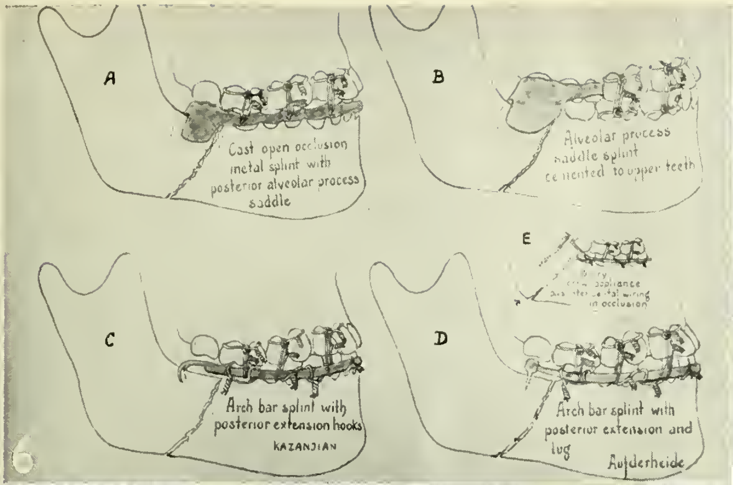
A
Cast open occlusion metal splint with posterior alveolar process saddle
B
Alveolar process saddle splint cemented to upper teeth
E
Berry appliance and inter-dental wiring in occlusion
C
Arch bar splint with posterior extension hooks
KAZANJIAN
D
Arch bar splint with posterior extension and lug
Aufderheide
6

Fig. 6. Methods of preventing displacement of edentulous posterior fragments presenting a small amount of alveolar process ridge in cases where the anterior fragment may be held in correct position by wiring the teeth in occlusion. Should the oral tissues not tolerate the pressure of splints, hooks, lugs, or screws, the posterior fragment may be secured by extra-oral direct fixation. (See figs. 7 and 8).

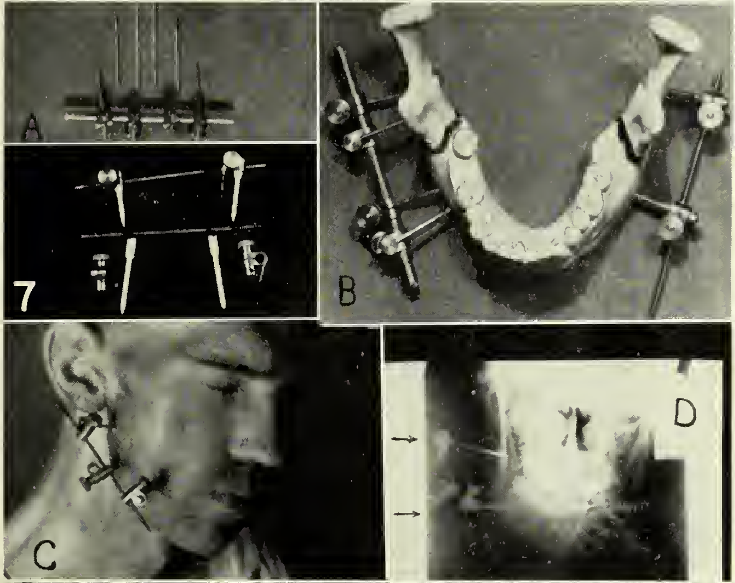

Fig. 7. Skeletal fixation by means of extra-oral vitallium screw or pin appliances. A—Assemblies for screw and pin technics. B—Cast of mandible showing pin and screw appliances for skeletal fixation. C—Photo of use of screw fixation appliance. Note absence of reaction or swelling of skin and subcutaneous tissues. D — Postero-anterior (P.A.) roentgenogram showing appliance.

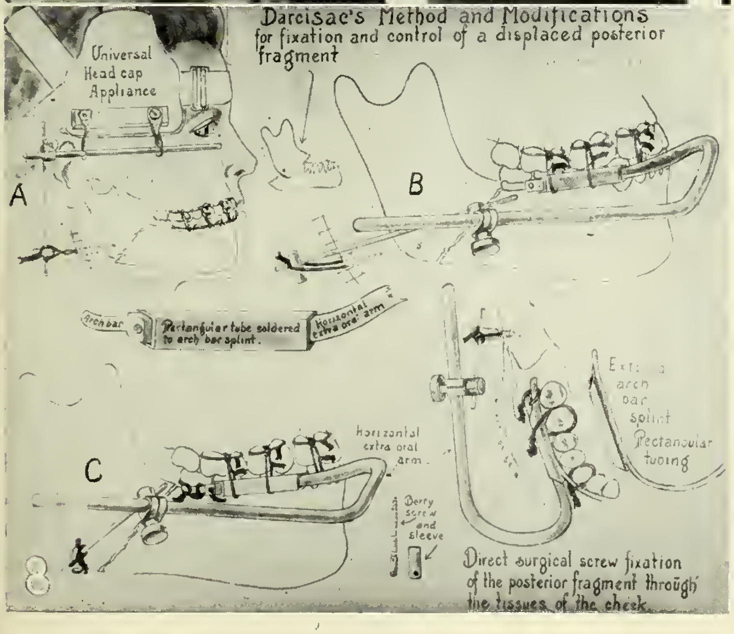
Darcisac's Method and Modifications for fixation and control of a displaced posterior fragment
Universal Head cap Appliance
A
B
Arch bar
Rectangular tube soldered to arch bar splint.
Horizontal extra oral arm
C
horizontal extra oral arm.
Berry screw and sleeve
Ext: a arch bar splint
Rectangular tubing
Direct surgical screw fixation of the posterior fragment through the tissues of the cheek.
8

Fig. 8. Methods of correcting displacement and securing a posterior fragment in fractures distal to the third molar region in cases where the anterior fragment may be secured in correct position by wiring the teeth in occlusion. When this is not possible, extra-oral direct surgical fixation (fig. 7) is indicated.

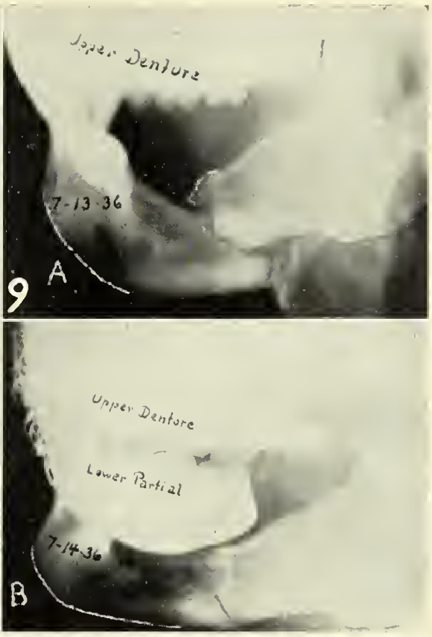

Fig. 9. Lateral roentgenograms showing the use of the patient's lower partial denture to hold down an edentulous posterior fragment. The patient's lower anterior teeth should be wired in occlusion with upper natural teeth if such are present. If the patient wears a full upper denture, adhesive powder may be used to hold it up in position and the lower teeth and partial denture are held in occlusion by external bandaging.

Direct surgical fixation of the alveolar process fragments to each other by wiring across the line of fracture within the mouth has been recommended by Kazanjian (fig. 11B). We have used this method with success but must emphasize the necessity of also making every effort to immobilize both fragments by wiring or splinting plus bandaging, etc. By doing so, the surgical wiring is protected against excessive strain, and complications such as inflammation, induration, infection, and sequestration are reduced to a minimum.

DISPLACED FRACTURES OF THE EDENTULOUS MANDIBLE

Fractures of the edentulous mandible may be single or multiple. They may involve the body and the alveolar process, thus affording an opportunity for support by intraoral denture splinting by the methods similar to those described for edentulous posterior fragments (fig. 6, A and B), or the fractures may be distal to the process ridge. The planes of the fracture lines may aid or favor retention after reduction or may tend to favor recurrence of the displacements to thus simplify or greatly complicate the problem of reduction and immobilization.

Bilateral fractures of the body of the edentulous mandible may present marked depression and distal displacement of the central fragment due to the pull of the geniohyoid, genioglossus, and mylohyoid muscles. The displacement of the lower jaw may be further complicated by a third or fourth fracture above the angle or through the necks of the condyles. Swelling of the tissues of the floor of the mouth and tongue may produce grave symptoms of interference with respiration and deglutition. The method of circumferential extraperiosteal wiring originally employed by G. V. Black, has been used by many experienced surgeons with success. The wires may be tightened over the teeth of the patient's own lower artificial denture, or over a clear acrylic alveolar process splint (fig. 12). Rustless steel or silver wires are passed around the body of the mandible outside the periosteum by means of a curved antrum trocar canula (fig. 13), through a large hypodermic needle, or threaded on a large curved needle. Small submandibular skin incisions are made below the lower border of the jaw at the point where the trocar canula or needle passed along the surface of the jaw approaches the skin. The trocar is removed, and the wire is passed through the canula from below upwards, and the canula is withdrawn. The trocar is reinserted in the canula, and the procedure is repeated on the opposite surface of the jaw and the other end of the wire is passed up through the canula to surround the jaw. An additional circumferential wire is inserted around the posterior fragment on each side. If there are also fractures of the ramus or condyle with distal displacement, it is wise to pass an additional wire through the loop of the anterior circumferential wire before it is pulled tight and twisted over the splint or denture. The ends of this added wire passing out through the submandibular skin incision may be used, if necessary, for external traction to a head appliance to overcome posterior displacement of the body of the jaw. The traction wire may be readily withdrawn if it is not needed. Lacerations of the mucous membrane and marked swelling may interfere with the manipulations necessary to reduce the displacement of the depressed central fragment and to line up the alveolar process ridge and the fractured segments of the body of the mandible on either side before the denture or splint can be adjusted satisfactorily and the circumferential wires tightened. Good assistance and lip and cheek retraction will make it possible for the surgeon to finally secure the fragments in a satisfactory position. It must again be stressed that postoperative complications such as irritation under the splint or denture or reaction or infection around the wires will be materially reduced if the splinted jaw is kept in steady contact with the upper teeth or an upper denture by means of wiring or external bandaging. The circumferential wires and splint are removed intraorally. Fortunately, union with slight or moderate displacement may be corrected by the dentist when new dentures are constructed.

During recent years, several articles have been published describing methods of treating fractures of the edentulous mandible by direct surgical fixation. Vitallium screws inserted into the mandible on either side of the fracture line through a vitallium plate resting on the mucosa is described by Strock[14] (fig. 11C). Bigelow[13] inserts the vitallium screws through the skin into the fragments and uses various means such as a plaster cast, external splint or metal bar to secure the screws in proper relation to each other (fig. 11). This method with an external metal bar is being used with success in England. Berry[8] advocates a screw implantation method using vitallium screws, sleeves, and alignment rods applied intraorally. These methods are distinct contributions to the literature of fractures of the jaws, but the reports as published leave much to be desired regarding specific types of fractures and displacements for which the methods are indicated. Little mention is made of postoperative care and additional methods of immobilization to give rest to the mandible in order to take every possible strain off the appliances and screws inserted into the bone. Every effort should be made to give support to the appliances and the screws that are inserted into the bone.

Displaced fractures of the body of an edentulous mandible are not infrequently seen several weeks after injury when considerable consolidation may have taken place. One should carefully analyze the prosthetic problem before undertaking the refracturing of the jaw, for in most cases of moderate displacements and contractures of the mandibular process ridge, the skilled dentist can provide new dentures that will function with complete satisfaction. After complete and strong union has taken place, certain bony projections may be excised without difficulty before the dentures are made. Refracturing in such cases usually involves direct mandibular circumferential wiring and splint fixation with five to eight weeks of exacting postoperative care. In addition, there are always possibilities of complications—infection with

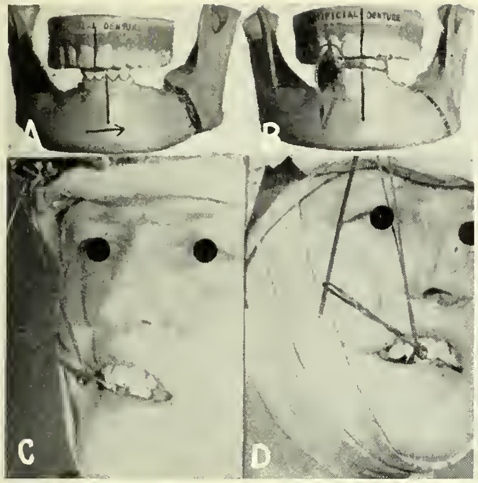

Fig. 10. Correction of displacement of a fractured edentulous posterior fragment of the mandible by means of a splint with an arm and extra-oral rubber band traction. A—Reconstructed cast showing the displacement. B—Incisal splint carrying an extra-oral arm. C and D—Photos showing the extra-oral rubber band traction attached to the Universal Head Cap shown in Figure 14.

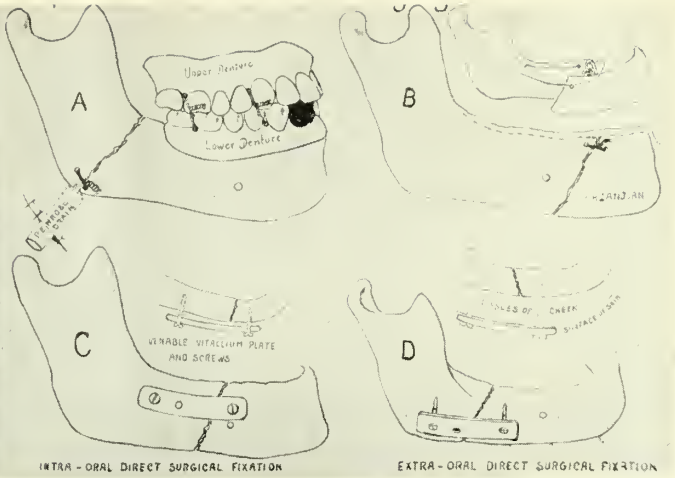
A
Upper Denture
Lower Denture
PENROSE DRAIN
B
KAZANJIAN
C
VENABLE VITALLIUM PLATE AND SCREWS
D
CHEEK
SURFACE OF SKIN
INTRA-ORAL DIRECT SURGICAL FIXATION
EXTRA-ORAL DIRECT SURGICAL FIXATION

Fig. 11. Direct surgical fixation of the fracture by wiring through the alveolar process (B) as recommended by Kazanjian is less subject to complications than the conventional method of wiring the fragments at the lower border through an external incision (A). Newer methods of skeletal fixation employing plates and screws are shown in C and D. Methods of direct surgical fixation for fractures of the edentulous mandible should be supplemented by dentures or splints and external bandaging.

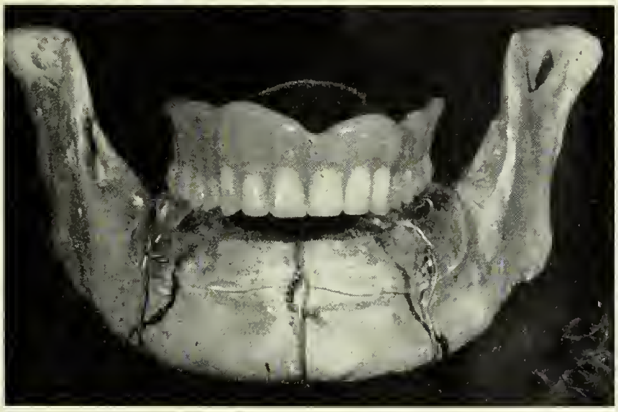

Fig. 12. Bilateral fractures of the edentulous mandible presenting a depressed and posteriorly displaced central fragment. Treatment by circumferential extra-periosteal wiring over an acrylic resin splint.

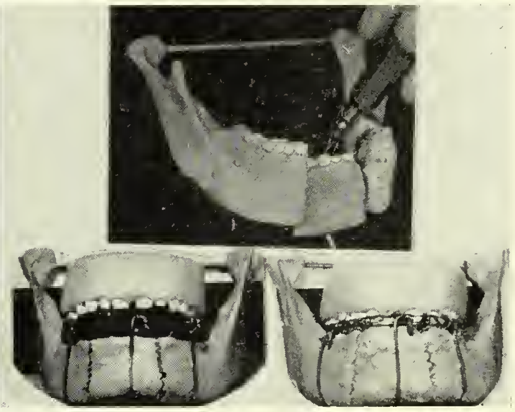

Fig. 13. Technic of application of circumferential extra-periosteal wiring and splint fixation as used for bilateral symphysis fractures.

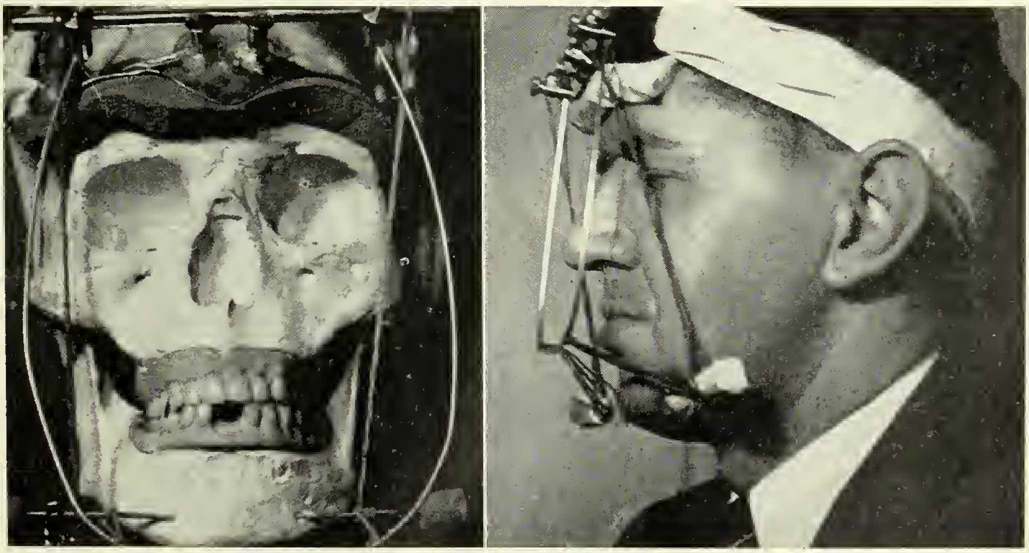

Fig. 14. Bilateral fractures of the necks of the condyles with posterior displacement of an edentulous mandible. The distal displacement was reduced by forcible manipulation and the mandible was held forward in its normal position and upward in proper occlusion into a splint and denture by rubber band traction from a Kirchner wire to a head appliance.

osteitis and necrosis. Such operations should therefore be reserved for patients with handicapping malunion deformities.

FRACTURES OF THE CONDYLES

About two years ago, an edentulous patient, age 45, presented with bilateral fractures of the condyle necks with marked distal displacement of the jaw and an impaction of the fracture on one side. The man was struck on the chin without, however, sustaining a fracture of the symphysis. On regaining consciousness, he found his mouth filled with some fourteen pieces of his lower denture and his upper denture was broken in two pieces. Fortunately, he saved all pieces of the dentures. The upper denture was repaired and the lower denture was reassembled to make it possible to reproduce it in a splint to occlude with the upper denture. It was found that the alveolar process ridge of the incisor region of the mandible was more than three quarters of an inch distal to its position before the accident. Repeated attempts to bring the mandible forward and retain it were unsuccessful until a Kirchner wire was drilled through the symphysis. Forcible manipulation reduced the displacement and the mandible was held forward and in correct alveolar process relationship by the lower splint and upper denture by means of forward and upward rubber band traction to a Universal Frontal head appliance and U-shaped wire (fig. 14). The postoperative care was relatively simple and consisted of removing and cleansing the splint and upper denture every other day. To accomplish this without danger of recurrence of displacement, the patient grasped the ends of the Kirchner wire and pulled his jaw slightly open and held it forward. Tender areas over the alveolar process were treated and the splint trimmed when necessary, then reinserted, and the rubber bands readjusted. The head appliance was maintained for twenty-six days, when the union seemed to have sufficiently progressed to prevent recurrence of displacement. The Kirchner wire was removed in forty days. New dentures were constructed and have been used with satisfaction. Recent examination shows no abnormality and the temporo-mandibular joints function normally.

This Kirchner wire method of holding the mandible forward and up in occlusion has a definite place in the surgery of fractured mandibles, particularly where bilateral overriding ramus fractures are present and the anterior teeth of the mandible are loosened or are not sufficiently secure to make possible efficient interdental wiring or dental splinting anteriorly. This method is more efficient and comfortable than forceable ace bandaging to hold up the chin and lower jaw against the maxilla. Furthermore, there is no danger of necrosis of the skin beneath the chin from bandage pressure when the Kirchner wire is used.

DISPLACED FRACTURES OF THE CONDYLES

Fractures of the neck of one or both condyles are common and are usually associated with fractures of the body or angle of the mandible. The fractures may occur at a high level just beneath the head of the condyle or may extend from the lower portion of the anterior surface of the condyle neck downwards and backwards to the mid portion of the posterior border of the ramus. The planes of the fracture lines are usually from the inner surface downwards and outwards to the external surface. This favors overriding and displacements of the fragments when the initial traumatism has been violent. Statements to the effect that fractures of the ramus and condyle rarely require treatment constitutes, in my opinion, very unsafe teaching, and it is contrary to the modern concepts of the treatment of fractures.

X-ray examination is essential, using the routine P.A. projections. The lateral jaw projection used should be directed so as to prevent interference of the spinal column with the detail of the ramus and condyle. The resulting film is, unfortunately, often a very oblique projection and is often misleading in that it shows very alarming displacements and overriding (fig. 15). In high fractures through the head or neck of the condyle, one of the routine X-ray projections for the temporomandibular joint may give further information to the surgeon. In most instances, the wiring of the teeth in occlusion with a two or three millimeter rubber block made of a split rubber tube interposed between the two most posterior upper and lower teeth to act as a fulcrum to depress the angle and ramus will correct, in a measure, the overriding of the fragments[15] (figs. 15 and 16). The tie wires are usually removed in three to four weeks. If some malocclusion and drifting recurs, the tie wires are again applied or diagonal rubber band traction may be used. Rubber band traction has been found effective in correcting malocclusion in condyle fractures that were undiagnosed for several weeks. This treatment usually results in strong union and normal function with a minimum amount of subsequent deviation of the jaw to the injured side on opening the mouth widely. In bilateral fractures of the condyle, there may be a marked degree of open bite displacement (fig. 16), necessitating rubber band traction anteriorly in addition to the rubber bite blocks in the molar regions on both sides. When the spasm of the elevator muscles has been overcome by the rubber traction, tie wires may be substituted to secure the teeth firmly in occlusion. In some instances, the P.A. views will seem to show an external rotation of the neck of the condyle with apparent separation of at least one centimeter between the fractured ends of the bone. When this is extreme, it can often be manipulated and held in a more satisfactory position by a pad and bandaging or by a spring pad attached to a head cap.

Fracture dislocations of the head of the condyle are seen occasionally and present a problem to the surgeon. The head is usually driven completely through a tear in the capsule to lie internal and anterior to the eminentia (fig. 17). We have in two of our cases, made attempts to replace the head within its capsule by open operation without success and then removed the head to produce a false joint similar to that produced after excision of the head for ankylosis. Subsequent function has been good, with a tendency for the jaw to swing

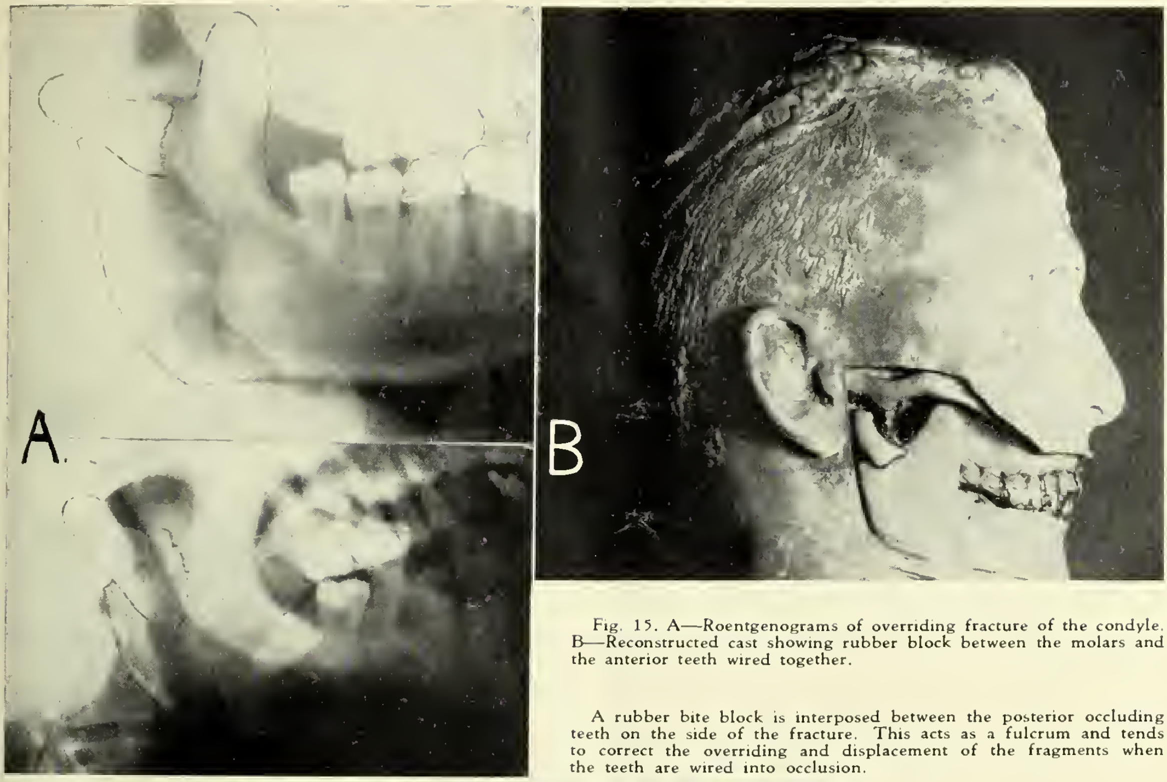

Fig. 15. A—Roentgenograms of overriding fracture of the condyle. B—Reconstructed cast showing rubber block between the molars and the anterior teeth wired together.

A rubber bite block is interposed between the posterior occluding teeth on the side of the fracture. This acts as a fulcrum and tends to correct the overriding and displacement of the fragments when the teeth are wired into occlusion.

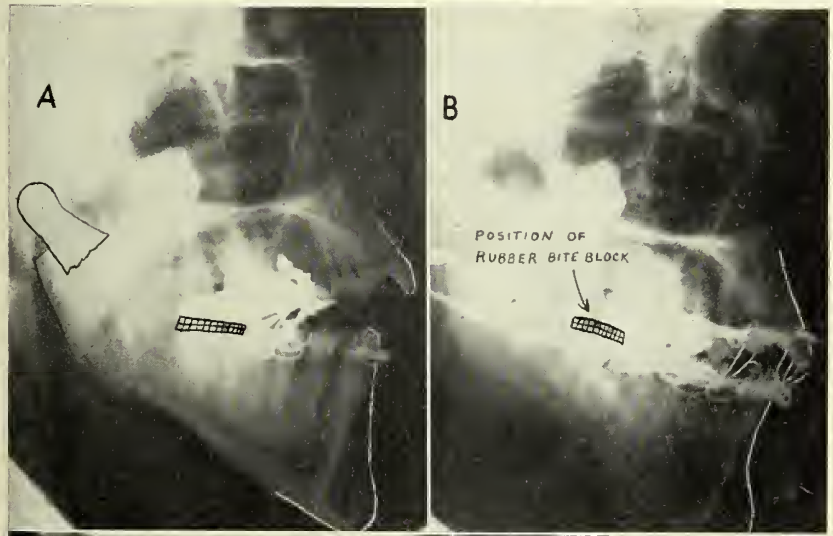

Fig. 16. A—Bilateral fractures of the condyles. Distal displacement and open bite. B—Bilateral fractures of the condyles after correction of the open bite by means of rubber band inter-dental traction.

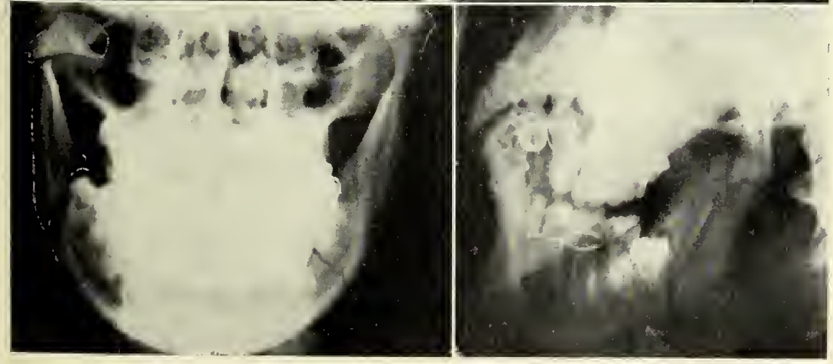

Fig. 17. Postero-anterior and lateral roentgenograms of fracture and dislocation of condyle head.

toward the affected side when the mouth is opened. This is the experience of other surgeons who have surgically removed such dislocated heads. For purposes of comparison, we, as well as other surgeons, have left undisturbed the fractured dislocated heads in two cases, wiring the teeth in occlusion in order to treat other fractures of the mandible in each case; there was no subsequent disability in mastication, though the swing of the jaw to the affected side on opening the mouth was noticeable. The whole problem of open operation on fractures of the condyle neck would be considerably clarified by reports of extensive studies of the types, the treatment and the postoperative results of several extensive series of such condyle fractures. For the present, it is wise to be conservative and not attempt operative interference, open reduction, and direct surgical wiring in such cases. This is the general opinion of authorities on the treatment of fractures of the jaw.

SUMMARY

The general principles of treatment of fractures of the mandible are discussed. The detailed treatment of complicated displacements is given with emphasis upon painstaking diagnosis and the simple and available methods that may be used to secure bony union without deformity.

BIBLIOGRAPHY

1. Moorehead, F. B.: A Better Method for Treating Fractures of the Jaws, J.A.M.A. 102:1655, (May 19) 1934.

2. Dingman, R. D.: Use of Rubber Bands in the Treatment of Fractures of the Bones of the Face and Jaw, J.A.D.A. 26:173, (Feb.) 1939.

3. Urist, M. R., and McLean, F. C.: Calcification and Ossification, J. Bone & Joint Surg. 23:16, (Jan.) 1941.

4. Lectures on Military Dentistry. American Dental Ass'n, 1941.

5. Gifford, A. C.: Clinical Report Illustrating the Application of Orthodontic Principles in the Treatment of Fractures of the Jaws, Internat. J. Orthodontia 18:1285, (Dec.) 1932.

6. Risk, P. A.: Role of the Orthodontist and the General Practitioner in the Treatment of Jaw Fractures, J.A.D.A. 28:884, (June) 1941.

7. Risdon, E. F.: Fractures of the Mandible and Maxillae, J.A.D.A. 23:1639, (Sept.) 1936.

8. Berry, H. C.: A New Departure from Orthodox Methods of Setting Fractured Edentulous Mandibles, J.A.D.A. 28:388, (March) 1941.

9. Blair, V. P.: Intra-oral Support of the Ramus in Fractures of the Lower Jaw, Dental Cosmos 23:1639, (May) 1923.

10. Kazanjian, V. H.: Treatment of Automobile Injuries of the Face and Jaws, J.A.D.A. 20:757, (May) 1933.

11. Aufderheide, P. J.: Treatment of Fractures of the Maxilla, Mandible, and Other Bones of the Face, J.A.D.A. 21:950, (June) 1934.

12. Gross, P. P.: Treatment of Posterior Fragments in Edentulous Fractured Mandibles, Dent. Digest 46:384, (Nov.) 1940.

13. Griffin, J. R.: Treating Fractures of the Mandible by Skeletal Fixation, Am. J. Orthodontia & Oral Surg. 27:364, (July) 1941.

14. Strock, A. E.: A Method for Treating Edentulous Mandibular Fractures, Bull. Conn. State Dental Ass'n 17:17, (Nov.) 1940.

15. Ivy, R. H., and Curtis, L.: Fractures of the Jaws, Lea & Febiger, 1931.

16. Kazanjian, V. H., and Strock, A. E.: Fractures of the Mandible, J.A.D.A. 29:76, (Jan.) 1942.

17. Waldron, C. W., and Balkin, S. G.: Fractures of the Maxilla, Surgery 2:183, (Feb.) 1942.

Vision Facts for Visual Reasons

Hedwig S. Kuhn, M.D.
Hammond, Indiana

IN the present emergency, the greater part of our thought and effort is directed toward the War Program. Big industries are now gearing their organization to top capacity. In this new organization, now more than ever before, it is useless and unfair for a superior to ask a helper to improve his work when he is below par visually and when good vision is a necessity for his work. It would be just as futile to ask a man with a severe laryngitis to speak more clearly. Before asking an employee to do better, management must be assured that the worker possesses the necessary visual requirements for his job.

For the first time that we know of, the varied knowledge of clinical medicine and the powerful analytical principles of statistical technics developed by applied psychology, have joined hands in a unique and tremendously effective program of research work toward a more scientific selection of labor. As the months roll by, Professor Joseph Tiffin of Purdue University and his staff working with me and my team of medical assistants, and the many industries that are our guinea pigs find it possible to release various aspects of the whole project.

Two angles of this enormous field are of particular interest here; first, the problem of job classification in terms of their varying demands on visual performance and second, age and its relation to visual performance. The Joint Committee of Industrial Ophthalmology of the American Medical Association and the American Academy of Ophthalmology, working in coöperation with the Department of Applied Psychology of Purdue University, has set up the following basic visual findings for a job analysis from a visual standpoint (replacing the inadequate Snellen chart procedure):

1. Acuity (sharpness of vision) for distances far and near, with and without correction.
2. Depth perception (ability to judge distance).
3. Color perception.
4. Eye muscle balance (ability for two eyes to coordinate smoothly and normally).

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*Read before the annual meeting of the American Student Health Association, New York, December 30, 1941.

By using these criteria, it is possible to analyze the first of the above-mentioned problems, namely that of job classification, into three simple categories:

1. Jobs where *danger* is a first consideration.
2. Jobs where maximum *efficiency* is essential.
3. Jobs requiring neither *special* visual safeguards for safety nor *special* excellency to insure accuracy.

With a statistical approach to visual problems in industry, it is possible to show with the utmost reliability trends and relationships of great importance in such a classification of jobs. First, take the problems of lost time, accidents, and their relationship to visual performance. The percentage of defects among men who had lost-time accidents revealed a greater frequency of accident cases among those failing the visual tests. Thus it has been computed that if all the employees in a particular mill were able to pass the whole battery of tests, accidents (in so far as they deal with visual factors) would be reduced about 20 per cent. Second, with regard to color tests, new statistical analyses of data have shown that there actually are four levels of difficulty, not the traditional "color positive" or "color negative" categories. The fact that color vision is a matter of degree, both qualitative and quantitative, is of tremendous importance in the selection of industrial employees. Such a scaling of color sensitivity bears on both safety and color discrimination in special types of work, dyes, color printing, chemicals, etc. It takes ten years to train a pressman who must know color. Since color sensitivity deteriorates with age, he must have 100 per cent to start with.

The major problem of age and its relationship to visual performance is of special interest. It has been stated by authorities that in job placement, thought must be given not only to the immediate capacities of the employee but also to his future capacities. Yet from the accident standpoint, it was found that among 7,000 employees on production and maintenance jobs in a steel mill, the younger half included 15 per cent more men injured in serious accidents over a three year period than did the older half of this group. Accidents are related inversely to age and experience on the job. It is among the young men, untrained men, now being called into industry, that accidents occur most frequently. Public health medicine must assist in finding ways to help these young people to adapt not only their hands and feet but their eyes to the demands of their new jobs, receiving whatever tools they need to make their eyes useful, even as they already receive tools to make their hands more useful. This relationship also holds true for "brain" jobs (blue print and other close readers).

Employers all too often assume that wearing glasses per se is a sign of weakness, yet microscopes and telescopes and the watch maker's loupe are accepted as necessary visual tools, as are also safety glasses and occupational glasses for very near work. Optical aids, in the broad sense, mediate between the visual demands of particular jobs and the visual performance ability of the individual on these jobs. This question of glasses is of special concern for the scientific setting up of standards in the large group of people over 40 years old, where most of our leaders, experienced workers, and supervisors are found. The function of accommodation (the physiologic mechanism necessary to see sharply and clearly at close ranges) is gradually and *normally* lost after one reaches the age of 40 until so-called "reading glasses" become necessary. Such glasses bring to their wearer the necessary perfection of visual performance. One government body requires of applicants for clerical jobs that all ages be able to read fine print without glasses, which is scientific nonsense. The human being is of course subject to increasing handicaps of vision with increasing age. And inasmuch as progressive industries have instituted maintenance programs for their machinery, they are also beginning to see the need of programs for the maintenance of human skills. In aviation many visual skills are necessary and operators after being carefully chosen, are trained visually before and during the continuance of their job, because such training has to be continued after a maximum level of performance has been reached in order to sustain that level. Such programs can become and are becoming a part of every modern industrial and business program. In summing up, we can say in the last analysis that:

1. The selection and placement of employees by means of convenient, accurate visual performance tests is important in the light of the demonstrable relationships between visual performance and job performance.
2. The compensation for visual handicaps and the amelioration of visual requirements is indicated for certain jobs by means of optical aids, especially for beginners on those jobs.
3. The periodic re-testing of visual performance (frequently in jobs that are most hazardous, most critical, or most important) is important in order to assure maintenance of visual skill of the same quality with which these men were selected and trained.
4. The understanding of age factors in the conservation of adequate visual skills is to be considered in specific instances.
5. And last but not least, the relationship of all of the above mentioned to the goal of safety and efficiency in the war effort has been dramatically proven.

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Minneapolis Academy of Medicine
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MINNEAPOLIS, MINN., JUNE, 1942

PERIODIC HEALTH EXAMINATIONS

The medical examinations of large numbers of young men for army service have revealed that many of the young adults in the population have physical defects which are correctible and preventable. An analysis of the defects causing army rejection shows that a large proportion are defects which have been present for some time but have been uncorrected. That a great many of these defects were present in early childhood and could have been cared for at that time is very probable. In the *Public Health Reports** for December 12, 1941, there is reported a study of a group of 225 selectees who were examined in Hagerstown, Maryland, the records of whose physical examinations when they were children in the schools of the county were available for comparison with the Selective Service physical examinations. The dental status observed in school children who 15 years later were selectees showed that in the children who were later rejected for army service because of teeth, at the time of the school examination 95.5 per cent of the group already had one or more decayed, missing or filled permanent teeth; while in the group who were accepted for army service, only 73 per cent as children had decayed, missing or filled permanent teeth. At the time of the school examination the number of decayed, missing or filled teeth per 100 children was twice as high among those children later rejected by the draft board physicians as among those who were placed in class 1A. This same study shows the same trend for other defects as well as for teeth. It indicates that a relatively large number of the selectees who were rejected because of defective dentition and vision already gave evidence of these same defects 15 years previously when they were in the elementary schools.

Studies such as these give ample evidence that our provisions for the periodic health examinations of school children as well as adults and for the correction of defects found are not functioning as efficiently as we might wish. The burden for the promotion and carrying out of the periodic health examination rests with the physician in private practice. Pediatricians have been able to teach the parents of their patients the importance of periodic examinations for the children, but unfortunately few of the children of the country are under the care of pediatricians. The family physician must accept the responsibility for the promotion of health examinations and for the correction of defects found.

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*"Child Health and the Selective Service Physical Standards," Public Health Reports 56:2365-2375 (Dec. 12) 1941.

R. E. B.

A PROBLEM IN MATHEMATICS

Most advocates of government control of medicine propound the view that such a change from the American System of Medicine is necessitated by the high cost of medical care. Proper medical care, they say, is beyond the financial reach of the indigent, the marginally indigent, and most of the middle class.

So far as is known, the cost of medical care is written in red ink and constitutes the credit side of the ledger. What the medical profession has on the debit side of the ledger in blue ink has not been calculated. From time to time, some suggestion should be made by the medical profession as to what constitutes the debits.

One contribution of the medical profession to compensate for the high cost of medical care might be cited as the reduction in the mortality rate of pneumonia. Reimann, in his book on The Pneumonias, states that the annual number of deaths from pneumonia in the United States is 100,000. Flippin has shown how the death rate of pneumonia in Philadelphia has decreased from 35 per cent in the days prior to the advent of sero- and chemo-therapy to approximately 10 per cent. Stahle also comments on a reduction of pneumonia mortality within recent years from 30 to 10 per cent. This represents a reduction in mortality of approximately two-thirds. Translated into national statistics as quoted by Reimann, this means that the lives of about 65,000 persons are saved annually. Christian's last edition of Osler's *Principles and Practice of Medicine* states that pneumonia involves males three times as frequently as females. Reimann states that males are twice as frequently afflicted as females. Thus, the lives of 45,000 males are saved per year. At a wage of $1,000 per year per male, 45 million dollars a year are saved.

It is well established that pneumonia carries its greatest fatality in infants and the aged, yet Reimann's monograph contends that pneumonia occurs more frequently in early and middle adult life. On these facts one might be justified in claiming that, as an average, each life saved from pneumonia death is increased in longevity or life expectancy ten years. In this manner, the 45 million dollars finally becomes 450 million, or practically half a billion dollars. Hence, the medical profession, through the reduction of pneumonia mortality alone has increased the national wealth practically half a billion dollars.

Other debits should be listed. For instance, consider the tuberculosis mortality which has decreased from 200 per 100,000 population in 1900 to 45 in 1939. Review the reduction in mortality of diphtheria, smallpox, meningitis and other infectious diseases. Peruse maternal, infant and neonatal mortality rate reductions. Remember that the mortality rate from all causes, 10.6 in 1938, was the lowest in the history of the United States. Add to these facts the increase in longevity in this country from 49.24 years in 1901 to 62.78 years in 1938.

The problem in mathematics involves the conversion of all these medical accomplishments into working hours, man-years of labor, increased national production and income, and other crude dollars and cents statistics. When this has been carried to the ultimate of its possibility, it will be found that American Medicine has amply discharged its obligation to Society. Perhaps through such a pecuniary approach, those who desire a change could be taught instead to point with pride to American Medicine, the institution which has given the American people a better state of health and a longer life than is enjoyed by any other comparable population in the world.

E. J. S.

AGE NOT INFIRMITY

Dr. Anton J. Carlson, as everyone knows, was chairman of the Department of Physiology at the University of Chicago until an inexorable rule of that institution retired him two years ago at the age of 65.

Those who have been regaled by his piquant remarks at scientific meetings in the past will now be interested in learning his reactions to enforced idleness based entirely upon chronological data. At a meeting of life underwriters in Chicago recently he said, "The person who looks forward to years of leisure is already dead. The enforced retirement of the aged is biologically cruel. The philosophy inspired by the Social Security program —that the public owes a man a living because he is 65 years old—will crush civilization. It's cruel to halt the productive activity of a man because he is 60, 70, or 80. It doesn't happen in any animate society except in our so-called civilization."

While this distinguished scientist has often expressed the need of a broader base of civilization than in the past—getting our sciences down to the level of the common people—he never advocated gearing everybody to a common denominator of mediocrity. He always deplored education by dictation and indoctrination and it is perfectly natural that he should resent a fixed rule of relegating to innocuous desuetude those whose further usefulness has been dubiously computed by the family almanac rather than tests of intellectual capacity. Age and infirmity are not synonymous.

A. E. H.

News Items

At the 1942 meeting of the North Dakota State Medical Association held in Jamestown, May 18-20, the following were elected to office: Dr. A. R. Sorenson, Minot, president; Dr. Frank Darrow, Fargo, president-elect; Dr. A. O. Arneson, McVille, first vice-president; Dr. James Hanna, Fargo, second vice-president; Dr. John Moore, Grand Forks, speaker of the House; Dr. L. W. Larson, Bismarck, secretary; Dr. W. W. Wood, Jamestown, treasurer; Dr. A. P. Nachtwey, Dickinson, delegate to the A.M.A.; Dr. O. T. Benson, Glen Ullin, alternate delegate to the A.M.A.

New officers of the South Dakota State Medical Association, elected at the annual meeting held in Sioux Falls, May 13-15, are as follows: Dr. J. J. Nessa, president; Dr. J. C. Ohlmacher, president-elect; Dr. D. S. Baughman, vice-president; Dr. C. E. Sherwood, secretary-treasurer; Dr. N. J. Nessa, delegate to the American Medical Association; and Dr. J. C. Ohlmacher, alternate delegate to the A.M.A.

The twenty-fourth annual meeting of the North Dakota Academy of Ophthalmology and Oto-laryngology was held under the presidency of Dr. A. E. Spear, Dickinson, at Jamestown, May 19, 1942. The following officers were elected: Dr. G. A. Larson, Fargo, president; Dr. T. W. Buckingham, Bismarck, vice-president; Dr. F. L. Wicks, Valley City, (re-elected) secretary-treasurer; Dr. M. B. Ruud, Grand Forks, elected to the Council. Luncheon was served to the group at the Gladstone Hotel after which Dr. Lawrence R. Boies of the Department of Oto-laryngology of the University of Minnesota addressed the Academy on the subject, "The Problem of Deafness." Dr. George M. Constans, Bismarck, presented a case report, "Cholesteatoma of the Orbit." Drs. H. W. Hawn of Fargo and M. T. Lampert of Minot were elected to active membership in the Academy. Dr. C. W. Robertson of Jamestown acted as chairman of the committee on arrangements for the meeting.

Newly elected officers of the North Dakota Society of Obstetrics and Gynecology are: Dr. J. H. Fjelde, Fargo, president; Dr. E. H. Boerth, Buffalo, vice-president; Dr. R. E. Leigh, Grand Forks, secretary-treasurer.

Dr. Gilbert Cottam has been appointed chief of the emergency medical service for Sioux Falls, South Dakota, under the United States office of civilian defense. During the first World War, Dr. Cottam was chief of surgical service at a base hospital in France, holding the rank of major at the end of the war. He filled a similar post at Fort Riley Kansas, for several months prior to November, 1919. For the last 15 years he has held a colonel's commission in the medical reserve.

Dr. A. I. Balmer, formerly of Pipestone, Minnesota, is now with the U. S. Army medical corps.

Dr. O. J. Hagen of Moorhead, Minnesota, received the honorary degree, doctor of laws, at the fiftieth anniversary commencement of Concordia college, June 2, 1942. The degree was granted for distinguished contributions to the field of education, medicine and community activity.

The Medical and Surgical Relief Committee of America has issued a call for medical supplies, instruments or equipment. Physicians who have surplus materials are asked to get in touch with any of the following committee members for this section: Dr. Claude C. Kennedy, Minneapolis; Dr. William R. McCarthy, St. Paul; Dr. Donald C. Balfour, Rochester; Dr. Henry W. Meyerding, Rochester; Dr. Owen D. Wangensteen, Minneapolis; Dr. Gilbert Thomas, Minneapolis; Dr. Arthur N. Collins, Duluth; Dr. Einar Johnson, Bemidji; Dr. J. F. Norman, Crookston.

Dr. Maurice S. Burdick, physician at the Crow Indian agency reservation near Billings, Montana, for the past two years, has been named physician at the Fort Totten agency, North Dakota.

Dr. James P. Aylen, 78, who had practiced medicine in North Dakota since 1888, died in a Fargo hospital, April 29, 1942. Dr. Aylen was one of the early presidents of the North Dakota State Medical association; he was elected in 1896 and was in office for eight years.

Report of South Dakota State Medical Auxiliary Meeting, Sioux Falls, May 13-15, 1942

Wednesday, May 13—The Advisory Board held their meeting at the home of Mrs. F. C. Nilsson (now past president), at 4 P. M.

Thursday, May 14—Registration at 9 A. M. Business session held at 10 A. M. at the History Club House at which time the following officers were elected for the ensuing year:

President—Mrs. J. C. Hagin, Miller.

President-elect—Mrs. D. S. Baughman, Madison.

Vice-president—Mrs. G. S. Adams, Yankton.

Second Vice-president—Mrs. E. A. Rudolph, Aberdeen.

Recording Secretary—Mrs. Edwin S. Stenberg, Sioux Falls.

Corresponding Secretary and Treasurer — Mrs. E. Trent Stout, Pierre.

Mrs. G. E. Burman, Carthage, was reappointed State Chairman of Public Relations and Publicity.

Memorial service for late members of the Auxiliary was conducted by Mrs. B. M. Hart of Onida. A dutch treat luncheon followed the business session at the History Club House at 12:30 P. M., a style show at 1 P. M., and at 4 o'clock in the afternoon a courtesy Tea at the home of Mrs. E. E. Gage, Riverview Heights. After the solos by Miss Alvina Palmquist, with Mrs. Saga Collins Boughton accompanying her, the guests visited the Gage gardens. At 6:30 P. M. there was a banquet at the Coliseum with Inter-Allied Professional Associations. A program of entertainment and dancing followed.

Friday, May 15—The South Dakota Medical Auxiliary closed its convention with a breakfast at the History Club House with Mrs. F. C. Nilsson, retiring president, presiding. The courtesy breakfast was attended by 50 members. Miss Nettie B. Cardin, society editor of the Argus Leader, spoke on her visit to the Pilgrimage Garden Club at Natchez, Mississippi, in March.

Adjournment of General Session.

LIST OF PHYSICIANS LICENSED BY THE MINNESOTA STATE BOARD OF MEDICAL EXAMINERS ON FEBRUARY 13, 1942

BY EXAMINATION

Name	School	Address
Adkins, Charles Douglas	U. of Minn., M.B. 1941	Mpls. General Hospital, Minneapolis, Minn.
Ahern, Eugene Edward	U. of Minn., M.B. 1939, M.D. 1940	University Hospital, Minneapolis, Minn.
Armstrong, Ralph Sharples	U. of Minn., M.B. 1940	University Hospital, Oklahoma City, Okla.
Bennett, John Konvalinka	McGill U., M.D. 1940	Mayo Clinic, Rochester, Minn.
Binder, Manuel Robert	U. of Minn., M.B. 1941	Mpls. General Hospital, Minneapolis, Minn.
Bradshaw, Stanley Porter	Stanford U., M.D. 1941	Mayo Clinic, Rochester, Minn.
Emerson, George Frederic	U. of Rochester, M.D. 1938	Mayo Clinic, Rochester, Minn.
Finkelnburg, William Oscar	U. of Minn., M.B. 1941	Ancker Hospital, St. Paul, Minn.
Forney, Richard Aldrich	Rush Med. Col., M.D. 1939	Mayo Clinic, Rochester, Minn.
Foster, Thomas Newton	Stanford U., M.D. 1939	Mayo Clinic, Rochester, Minn.
Freeman, Charles Doney, Jr.	U. of Minn., M.B. 1941	Ancker Hospital, St. Paul, Minn.
Glover, Robert Prentice	U. of Pa., M.D. 1939	Mayo Clinic, Rochester, Minn.
Gorsuch, Melvin Thomas	Cincinnati Med. Col., M.B. 1940, M.D. 1941	Mayo Clinic, Rochester, Minn.
Guernsey, Dexter E.	U. of Minn., M.B. 1940, M.D. 1941	Mayo Clinic, Rochester, Minn.
Guthrie, William Henry	Kansas U., M.D. 1940	Graceville, Minn.
Hatch, Harvey Allan	Johns Hopkins U., M.D. 1940	University Hospital, Minneapolis, Minn.
Haywood, Guy Schrag	Northwestern U., M.B. 1940, M.D. 1941	Mayo Clinic, Rochester, Minn.
Kammer, Huldrick	Northwestern U., M.B. 1940, M.D. 1941	Ancker Hospital, St. Paul, Minn.
Kelly, John Patrick	U. of Minn., M.B. 1941	St. Mary's Hospital, Duluth, Minn.
Korda, Henry Alexander	U. of Minn., M.B. 1941	Miller Hospital, St. Paul, Minn.
Large, Henry Ranney	Western Reserve, M.D. 1938	Mayo Clinic, Rochester, Minn.
Larson, Roger Adolph	U. of Minn., M.B. 1940	Mpls. General Hospital, Minneapolis, Minn.
Lillehei, C. Walton	U. of Minn., M.B. 1941	Mpls. General Hospital, Minneapolis, Minn.
Litow, Sidney Samuel	U. of Ill., M.B. 1940, M.D. 1941	Mpls. General Hospital, Minneapolis, Minn.
Mellon, Miriam Hinsdale	U. of Rochester, M.D. 1939	6055 Bunkerhill Road, Pittsburgh, Pa.
Merendino, Alvin Aurelius	Yale U., M.D. 1940	University Hospital, Minneapolis, Minn.
O'Kane, Thomas Walker	U. of Ill., M.D. 1941	Midway Hospital, St. Paul, Minn.
Ochsner, Albert John, II.	Med. Col. of Va., M.D. 1940	Mayo Clinic, Rochester, Minn.
Pearson, Donald Joseph	Ohio State U., M.D. 1940	Mayo Clinic, Rochester, Minn.
Peterson, Kenneth Adolph	U. of Minn., M.B. 1941	Mpls. General Hospital, Minneapolis, Minn.
Polski, Paul George	U. of Minn., M.B. 1940, M.D. 1941	Kings County Hospital, Brooklyn, N. Y.
Rowland, Robert Thomas	U. of Minn., M.B. 1941	Ancker Hospital, St. Paul, Minn.
Rulison, Elbert Theodore, Jr.	Harvard U., M.D. 1939	Mayo Clinic, Rochester, Minn.
Schulberg, Verne Andreas	U. of Minn., M.B. 1941	St. Joseph's Hospital, St. Paul, Minn.
Selvig, Howard Stanley	U. of Minn., M.B. 1941	Mpls. General Hospital, Minneapolis, Minn.
Sigmond, Harley Meredith	U. of Minn., M.B. 1940	Abbott Hospital, Minneapolis, Minn.
Sparling, Fred Newman	U. of Manitoba, M.D. 1940	Mayo Clinic, Rochester, Minn.
Walsh, Edward Francis	U. of Minn., M.B. 1941	Ancker Hospital, St. Paul, Minn.
Wellman, William E.	U. of Minn., M.B. 1940, M.D. 1941	Lake City, Minn.
Wells, Samuel Mauldin	Harvard U., M.D. 1940	University Hospital, Minneapolis, Minn.
Wilson, George Theodore	U. of Minn., M.B. 1941	1900 Delaware Ave., St. Paul, Minn.
Wilson, Kenneth George	U. of Minn., M.B. 1940, M.D. 1941	Mayo Clinic, Rochester, Minn.

BY RECIPROCITY

Burt, Arthur Cullen	U. of Chicago, M.D. 1935	1201—14th Ave. N., Fargo, N. D.
Houkom, S. Sverre	U. of Minn., M.B. 1932, M.D. 1934	Duluth Clinic, Duluth, Minn.
Jessico, Charles Michael	Loyola U., M.D. 1936	Duluth Clinic, Duluth, Minn.
Martin, Gordon Mather	U. of Neb., M.D. 1940	Mayo Clinic, Rochester, Minn.
Taylor, Edward Stewart	U. of Iowa, M.D. 1936	Worthington Clinic, Worthington, Minn.

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Flinn, John Hyslop	Northwestern U., M.B. 1940, M.D. 1941	Mayo Clinic, Rochester, Minn.

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The JOURNAL LANCET

Minneapolis, Minnesota
July, 1942

Vol. LXII, No. 7
New Series

Use of Sulfathiazole to Eliminate Bacterial Contamination in Stored Plasma

Milan Novak, M.D., Ph.D.†
Chicago, Illinois

DURING the last decade the value of whole blood and plasma has been established in many clinical conditions. To facilitate the administration of these substances, methods of storage have been devised. The first organized blood bank in this country was the one which was instituted at the Cook County Hospital following the investigation by Dean D. J. Davis and the late Dr. Bernard Fantus of the University of Illinois, College of Medicine, of the methods used in Russia.[1] Numerous blood banks throughout the country have been patterned after the one established at the Cook County Hospital.

A number of investigators, notably Elliot,[2] Levinson[3] and Strumia[4] in the last two years have re-emphasized the value of blood plasma as a substitute for whole blood in numerous clinical conditions and a great deal of emphasis is being placed on the use of this material in shock, burns, hypoproteinemia, and cerebral edema—conditions in which whole blood is not indicated or actually contraindicated. Consequently attempts have been made to accumulate reserve supplies of plasma by storage procedure.

Main Objectives in Storage

Several methods for the preservation and storage of plasma have been proposed[4c,d,e,f,5] which have as their main objectives the following: (1) to prevent changes in the constituents over a period of time; (2) to minimize the hazard of bacterial contamination.

We have introduced a method which accomplishes these objectives very well.[6,7,8] It has many advantages and can be used to preserve both whole blood or blood plasma. It involves the addition of small quantities of the sulfonamide drugs to freshly drawn blood. Plasma preserved in this manner may be stored in the liquid state, is immediately available for use, and the essential elements are not appreciably altered. The problem of bacterial contamination is entirely eliminated. The efficiency of the method has been confirmed,[9,10,11,12] and it has been successfully used in practice.

Undue Emphasis on Certain Plasma Constituents

Much undue emphasis has been placed on the fact that prothrombin, complement, and fibrinogen slowly deteriorate in plasma when it is kept in the fluid state. This emphasis is not justified when the practical aspect is taken into consideration because none of these constituents are necessary in instances where plasma is indicated. In the therapy of shock, burns, cerebral edema, and hypoproteinemia, there is little need for prothrombin, fibrinogen, or complement. Therefore, the chief problem to deal with in the storage of liquid plasma is the more serious one of bacterial contamination. The recent adverse results encountered in the "Plasma for Britain" project,[13] where numerous instances of gross contamination occurred, serves to emphasize the fact that maintaining sterility is a major goal in the storage of plasma.

Proposed Methods for Storing Plasma

A number of methods have been proposed for storing plasma:

1. Storage at room temperature in the liquid state.
2. Refrigeration at 4° C. in the liquid state.
3. Refrigeration at 4° C. with merthiolate added.
4. Desiccation within cellophane cylinders.

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†Department of bacteriology and public health, University of Illinois.

TABLE I.

Storage at	20°—24° C.						4°—6° C.	
Specie	Staph. albus		B. mycoides		Vibrio species		Vibrio species	
Treatment	Control	Drug 0.1%	Control	Drug 0.1%	Control	Drug 0.1%	Control	Drug 0.1%
(Days)								
0	20	20	60	70	410	90	380	260
3	30	20	40	0	10^6+	0	10^6+	10
10	10^1+	0	10^4+	0	10^6+	0	10^6+	0
30	10^6+	0	10^6+	0	10^6+	0	10^6+	0
186	10^6+	0	10^6+	0	10^6+	0	10^6+	0

5. Desiccation from the frozen state.
6. Storage by freezing plasma.
7. Storage in the liquid state with a sulfonamide added.

In the above procedures (1,2,3,4) where liquid plasma is maintained for any length of time at either room or refrigerator temperature it has been conclusively shown that bacterial contaminants will readily multiply. This is true even when merthiolate is added—a fact too infrequently appreciated. Desiccation from the frozen state is an extensive procedure requiring special technical help and an expensive apparatus. Another disadvantage of this method is the fact that bacterial contaminants are not killed but actually preserved in a viable state by this procedure since the method of desiccation of bacterial cultures to preserve them for future use has been carried out routinely in just this way in many bacteriological laboratories. Desiccation of plasma, therefore, fails to solve the problem of bacterial contamination. The method involving freezing of plasma has a similar disadvantage in addition to requiring special apparatus for storage and time for thawing the material before use.

PRESERVATION WITH SULFONAMIDES

We have developed a method of preserving plasma with the sulfonamide compounds. Plasma to which 0.2 per cent of sodium sulfathiazole is added may be kept indefinitely without danger of contamination at either room temperature or in the refrigerator and actual sterilization will take place in contaminated plasma if stored for a few days. Fluid plasma is immediately available for use and the small amount of the sulfonamide compound present is no serious objection to its intravenous use. Certain hospitals have instituted the method and are using it with success.

EXPERIMENTAL METHODS

A series of tubes each containing five milliliter quantities of human plasma were inoculated with less than 500 organisms per milliliter. The sulfonamide compound under investigation was added in quantities ranging from 0 per cent to 0.2 per cent. Duplicate experiments were set up and one was allowed to remain at room temperature (20° C.—24° C.) while the other was placed into a 4° C.—6° C. refrigerator. Periodic quantitative examination of each specimen was carried out to determine the bacterial population. In the experiments a total of 114 strains of bacteria were used all of which were either isolated from contaminated blood or plasma or from natural sources of such contaminants as soil, human cutaneous surfaces, or air. The species included cocci, gram negative rods, anaerobes, and sporeformers. The compounds investigated were sulfanilamide, sodium sulfapyridine, sodium sulfathiazole, and to a limited extent, sodium sulfadiazine. Certain advantages of sulfathiazole aside from its bacteriostatic activity prompted its adoption for more extensive investigation in this work.

EXPERIMENTAL DATA

Since it is not practical to present the data in detail, a representative result is shown in Table I which indicates the bacterial population after various intervals, using three different bacterial species and sodium sulfathiazole in 0.1 per cent concentration.

DISCUSSION

The results in general indicate both a bacteriostatic and bactericidal action. The latter is more rapid at room temperature so that in most instances actual sterilization of the experimental specimens takes place in from three to ten days. The same results are obtained at refrigerator temperatures with species which show growth in the controls at this low temperature except that a longer period of time is often necessary for complete sterilization. Of the 114 strains tested, four required a 0.2 per cent concentration of the drug to bring about comparable results. Although these strains are exceptional in their resistance to sodium sulfathiazole it is desirable to use this higher concentration routinely to eliminate any possible danger due to growth of similar resistant strains. Certain investigators[14] attempting to confirm this method have taken the liberty of using lesser quantities (.02 per cent) of the sulfonamide compounds for preservation at incubator temperatures over long periods of time. It should be emphasized that one should use 0.2 per cent of the compounds as a final concentration in plasma in all conditions where prolonged storage is desired or where a range of temperature is likely to be encountered.

ROUTINE APPLICATION OF THE METHOD

Blood from the donor may be taken directly into a solution of 3 per cent sodium citrate and 2 per cent sodium sulfathiazole. Fifty milliliters of such a solution may be placed into routine transfusion flasks and autoclaved previous to use. This amount of solution is sufficient for about 450 milliliters of donors blood and makes a final concentration of 0.3 per cent sodium citrate and 0.2 per cent sodium sulfathiazole. The blood may be stored for future use in blood transfusions or the plasma may be removed immediately and stored. Likewise outdated whole blood may be used as a source of plasma.

No appreciable hemolysis occurs in blood stored in this way. Gross contamination does not take place even when quantities of the sulfonamide compound as low as 0.02 per cent are used, if the period of storage does not exceed ten days at refrigerator temperatures.

Summary

Numerous methods proposed for the storage of plasma are unique in that they do not solve the most serious problem involved—the problem of bacterial contamination. Methods involving desiccation or freezing plasma merely minimize the dangers of bacterial growth since bacteria actually remain viable in plasma treated in this way. Since such material exists in the fluid form for some time either before desiccation or freezing or after reconstitution or thawing it is apparent that bacterial contaminants will multiply at such times and produce pyrogenic substances.

We have shown that the addition of 0.2 per cent sodium sulfathiazole to citrated blood or plasma not only prevents bacterial proliferation but actually sterilizes the material over a short period of time. There is no loss due to bacterial contamination and transfusion reactions since pyrogenic factors are reduced to a minimum. Since the plasma does not require reconstitution from the desiccated or frozen state it is immediately available in the fluid form for emergency use. No specific temperature for storage is required so that the danger of bacterial contamination when the material is allowed to remain at room temperatures for several hours as sometimes occurs in operating rooms is eliminated. The simplicity, safety, and economy of this method justifies its routine use instead of the more complicated methods of freezing or desiccating plasma.

Conclusions

1. Bacterial contamination of blood or plasma is the only serious objection to storage of such material in the fluid state.

2. Sodium sulfathiazole in a concentration of 0.2 per cent completely solves the problem of bacterial contamination, since no organisms were encountered from any source which would grow in this concentration.

3. Actual sterilization of plasma occurred when 114 strains of bacteria isolated from natural sources of contamination were tested.

4. Plasma containing the sulfonamide derivative may be kept at either room or refrigerator temperature so that transportation of this material is simplified.

5. Storage of plasma in the fluid state with sodium sulfathiazole added is safe, economical and immediately available.

6. The more complicated and expensive methods of desiccating plasma or keeping it in the frozen state are not necessary.

Bibliography

1. Fantus, Bernard: Blood Preservation, J.A.M.A. 109:128 (July 10) 1937.

2. (a) Elliott, J., Nesset, N., and Tatum, W. L.: The Use of Plasma as a Substitute for Whole Blood, No. Carolina M. J. 1:283 (June) 1940.
   (b) Elliott, J., Busby, G. F., and Tatum, W. L.: Some Factors and Observations on Preparation and Preservation of Dilute Plasma, J.A.M.A. 115:1006 (Sept. 21) 1940.
   (c) Elliott, J.: Blood Plasma, South. Med. Surg. 103:252 (May) 1941.
   (d) Elliott, J., Tatum, W. L., and Busby, G. F.: Blood Plasma, Military Surgeon 88:118 (Feb.) 1941.

3. (a) Levinson, S. O., Neuwelt, F., and Necheles, H.: Human Serum as a Blood Substitute, J.A.M.A. 114:455 (Feb. 10) 1940.
   (b) Levinson, S. O., Necheles, H., and Rubovits, F. E.: Human Serum Transfusions, J.A.M.A. 115:1163 (Oct. 5) 1940.
   (c) Levinson, S. O., and Wolf, A. M.: Human Serum; its application in medicine, M. Clin. North America 25:219 (Jan.) 1941.
   (d) Levinson, S. O.: Human Serum, Tri-State M. J. 12:226 (April) 1940.

4. (a) Strumia, M. M., Wagner, J. A., and Monaghan, J. F.: The Intravenous Use of Serum and Plasma, Ann. Surg. 111:623 (April) 1940.
   (b) Strumia, M. M., Wagner, J. A., and Monaghan, J. F.: The Use of Citrated Plasma in the Treatment of Secondary Shock, J.A.M.A. 114:1337 (April 6) 1940.
   (c) Strumia, M. M., McGraw, J. J., and Reichel, J.: Preparation and Preservation of Human Plasma; Collection of Blood and Separation of Plasma, Am. J. Clin. Path. 11:175 (March) 1941.
   (d) Strumia, M. M., and McGraw, J. J.: Preparation and Preservation of Human Plasma; Drawing Off, Pooling, and Distribution of Plasma, Am. J. Clin. Path. 11:288 (April) 1941.
   (e) Strumia, M. M., McGraw, J. J., and Reichel, J.: Preparation and Preservation of Human Plasma; Freezing of Plasma and Preservation in the Frozen State, Am. J. Clin. Path. 11:388 (May) 1941.
   (f) Strumia, M. M., McGraw, J. J., and Reichel, J.: Preparation and Preservation of Human Plasma; Drying of Plasma from Frozen State by Low Temperature Condensation in Vacuo, Am. J. Clin. Path. 11:480 (June) 1941.
   (g) Strumia, M. M., McGraw, J. J.: Frozen and Dried Plasma for Civil and Military Use, J.A.M.A. 116:2378 (May 24) 1941.
   (h) Strumia, M. M., and McGraw, J. J.: Development of Plasma Preparations for Transfusions, Ann. Int. Med. 15:80 (July) 1941.

5. Reported by:
   (a) Edwards, F. R., Kay, J., and Davies, T. B.: The Preparation and Use of Dried Plasma for Transfusion, Brit. M. J. 1:377 (March 9) 1940.
   (b) Elser, W. J., Thomas, B. A. and Steffen, G. I.: Desiccation of Sera and other Biological Products (Including Micro-organisms) in the Frozen State with Preservation of Original Qualities of Products so Treated, J. Immunology 28:433 (June) 1935.
   (c) Flosdorf, E. W., and Mudd, Stuart: Procedure and Apparatus for Preservation in "Lyophile" Form of Serum and other Biological Substances, J. Immunol. 29:389 (Nov.) 1935.
   (d) Flosdorf, E. W., and Mudd, Stuart: An Improved Procedure and Apparatus for Preservation of Sera, Micro-organisms and other Substances—The Cryochem Process, J. Immunol. 34:469 (June) 1938.
   (e) Flosdorf, E. W., Stokes, F. J., and Mudd, Stuart: The Desivac Process for Drying from the Frozen State, J.A.M.A. 115:1095 (Sept. 28) 1940.
   (f) Greaves, R. I. N., and Adair, M. E.: High Vacuum Condensation Drying of Proteins from the Frozen State, J. Hyg. 39:413 (July) 1939.
   (g) Hartman, F. W.: Use of Cellophane Cylinders for Desiccating Blood Plasma: Rapid and Bacteriologically Safe Method, J.A.M.A. 115:1989 (Dec. 7) 1940.
   (h) Hill, J. M., and Pfeiffer, D. C.: A New and Economical Process Particularly Suitable for the Preparation of Concentrated Plasma or Serum for Intravenous Use: The Adtevac Process, Ann. Int. Med. 14:201 (August) 1940.

6. Novak, Milan: Use of Bacteriostatic Drugs in Preservation of Blood for Transfusion, Proc. Soc. Exp. Biol. & Med. 41:210 (May) 1939.

7. Novak, Milan: Preservation of Stored Blood with Sulfanilamide, J.A.M.A. 113:2227 (Dec. 16) 1939.

8. Novak, Milan: The Use of Sulfonamide Derivatives as a Solution to the Problem of Bacterial Contamination in Stored Plasma. (To be published).

9. Hunwicke, R. F.: Sulfanilamide as a Preservative in Stored Blood, Brit. M. J. 2:380 (Sept. 21) 1940.

10. Harper, S. B., Osterberg, A. E., Priestley, J. T., and Seldon, T. H.: Changes in Serum Protein and Hemoconcentration in Man, J.A.M.A. 116:1760 (April 19) 1941.

11. Becart, A., and Philippe, B.: Human Plasma Treated with Sulfanilamide; Advantages for Emergency Transfusions in Absence of Donors, Especially in War Time, Presse med. 48:535 (1940).

12. Harington, C. R., and Miles, A. A.: Storage of Blood for Emergency, Brit. M. J. 1:1202 (June 10) 1939.

13. Report of the Blood Transfusion Association Concerning the Project for Supplying Blood Plasma to England, Jan. 31, 1941, Blood Transfusion Association, New York, N. Y.

14. MacKay, M. E.: The Bacteriostatic Effect of Disinfectants in Human Serum and Citrated Plasma, Brit. M. J. 1:747 (May 17) 1941.

Allergy and Resistance in Cutaneous Tuberculosis*

Henry E. Michelson, M.D.
Minneapolis, Minnesota

IN a study of allergy in tuberculosis, allergy must first be defined as an organism's ability to react in a changed manner after the organism has been subjected to a previous experience with an invading germ, in this instance the tubercle bacillus, and the inflammation resulting from its reception and growth. In man this usually results in hypersensitivity which is manifest by an altered reaction to tuberculin, depending of course on the dosage and mode of application. The altered reactivity of the hypersensitive state seems to be expressed solely in increased speed and intensity or quantity of inflammatory response. The qualitative change is not so important although the type of the cellular influx may vary considerably. In primary or acute tuberculosis this hypersensitivity seems easily explained while in chronic tuberculosis the factors of sustained altered reaction, reactivation, and resistance to infection must be considered.

The reaction between allergy and immunity is the subject of a voluminous literature and, in spite of many experimental and clinical studies, a uniformity of concept does not exist. The question of parallelism between the two conditions is especially discussed, and from a clinical point of view the desirability of the presence of an allergic or non-allergic state on the subsequent prognosis is of great importance.

There is no generally accepted definition for immunity, which is different in different diseases. Whether one is immune to a certain infection or not is impossible to prove, and how to become or to remain immune is not known for most diseases.

Allergy is a more specific process than immunity. It can be estimated or measured more readily and in the light of present knowledge seems to be better understood even though its significance in tuberculosis cannot always be evaluated. One may state that immunity and allergy almost always co-exist in tuberculosis and that the mechanism of production must be similar. Allergy without immunity is difficult to conceive, for we know that allergy by definition is an altered reactivity following an infection, and that an allergic animal always possesses some immunity. Whether or not the animal is ultimately immune cannot be ascertained at the same time that the allergic state is proved to be present for there is no measure for immunity and even if it is indicated to be present, its degree or duration cannot be tabulated.

Let us for a moment look into the inflammatory process following successful inoculation with tuberculosis in a non-allergic animal. In order that the inoculation be successful the bacilli must find conditions favorable for their growth and multiplication. The tissues respond to the invasion by an inflammatory reaction, which is more or less characteristic of the animal species to which the host belongs. Since the inflammatory reactions of tuberculosis can be reproduced by the use of substances extracted from the body of the tubercle bacilli, it is very likely that the elements of the inflammation are the result of the specific response to the component parts of the bacillus. Therefore, it would seem that disintegration of the bacilli takes place and the resulting inflammation and the chronologic course of events is dependent upon the speed with which the bacilli are separated into their various inflammation-provoking parts.

Acute exudative inflammation such as characterizes acute primary tuberculosis is caused by proteins of the tubercle bacillus, while chronic productive inflammation is caused by certain lipoids derived from the bacilli. These reactions must be produced by injections of organisms killed by heat, but obviously a continuation of the process depends upon the growth and multiplication of the bacilli in the body. The first cells which respond to injections of tubercle bacilli are the polymorphonuclear leucocytes. They engulf and localize the bacilli thereby determining the site of the future tubercle. Within twenty-four hours the polymorphonuclear leucocytes are phagocytized and destroyed by large mononuclear cells which complete the development of the tubercle and are probably the source of the epithelioid cells. It is well known that in hypersensitive animals this process is much more rapid and intense. Therefore the presence of allergy is an accelerator of tuberculous inflammation. In primary infection, allergy as demonstrated by the tuberculin reaction develops after tubercle formation has occurred and the time varies greatly depending upon numerous factors. The fact that there is no allergy without tubercle formation has been proved many times. The ante-allergic period is of vast significance in childhood tuberculosis and in average favorable cases is from three to eight weeks. A very early appearance of allergy is a poor prognostic sign.

There has been much speculation concerning the effect of allergy on reinfection. Animal experimentation has shown that by reinoculation lesions can be more readily produced in allergic than in non-allergic animals, but that healing is more rapid in allergic animals. These experiments have also shown that a marked degree of resistance may be developed with primary pulmonary infection even in the presence of allergy. It is well known that the tubercle bacillus as well as tuberculin are violent poisons to the tuberculous subject. The hypersensitive subject, however, has the ability to destroy bacilli and to develop a manifest degree of immunity. It has also been shown that tuberculous inflammatory tissue has a much greater affinity for tuberculin than normal tissue. When animals which have been allergized and later desensitized are compared with similar allergic animals which have not been desensitized it is found that both groups have about the same degree of immunity. These and other experiments have shown that there is no strict correlation between immunity and allergy in tuberculosis, and it has been clearly demonstrated both experimentally and clinically that a high degree of allergy does not by any means insure a good prognosis.

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*From the division of dermatology, University of Minnesota, Dr. Henry E. Michelson, director. Read before the Academy of Dermatology in New York City, December 10, 1941.

It would seem, therefore, that acute excessive allergic inflammation is not essential to the operation of immunity nor does it allow one to conclude that marked response to tuberculin shows a correspondingly high degree of resistance to or power to overcome invading tubercle bacilli. Studies of the fibrinous network about the focus of reinfection in experimental tuberculosis has shown that highly sensitized tissues seem to possess definite localizing capacities, a fact which must be of great importance in cutaneous tuberculosis. In these experiments it has also been demonstrated that the more intense the reaction the greater is the inflammation in the surrounding lymphatics. In the extremely severe reactions of highly sensitive guinea pigs the lymph vessels become occluded, while in the less sensitive rabbit they remain patent thus apparently permitting the passage of the tubercle bacilli to the draining lymph nodes.

No discussion of allergy is complete without mentioning anergy, a term which has been used extensively in dermatology especially because of the negative tuberculin reactions so frequently encountered in patients who have sarcoid.

The absence of a reaction to tuberculin may mean complete freedom from tuberculosis, which constitutes an absolute anergy. It may indicate that the individual who has been sensitive to tuberculin has lost the sensitivity because of his ability to overcome this particular indication of infection or even completely to eradicate the infection and return precisely to the same state that he was in before infection.

Certain diseases such as measles may bring about a temporary negativity and possibly if sarcoid is due to a cause other than the tubercle bacillus the other infection can offset the tuberculin sensitivity. This may be accomplished by the production of certain antidotal substances which have been called anticutines. Severe fulminating and terminal tuberculosis may bring about a negative tuberculin reaction. To date I have not been impressed by any explanation for the anergy which so frequently exists in patients who have sarcoid. Two views may be given: first, that if sarcoid is due to tuberculosis the patient possesses qualities which neutralize the products which cause a positive tuberculin reaction, and, secondly, the disease is not a form of tuberculosis, but has the property of destroying sensitivity to tuberculin. The cause of positive anergy is not understood, but in negative anergy one may more easily feel that he sees an explanation since, in this instance, loss of resistance and loss of allergy go hand in hand.

Experiments conducted recently on a patient with uveoparotitis have shown that in the presence of that disease the patient is practically immune to the usual intracutaneous dose of B.C.G. but reacted to a dose three times as large, and the regional adenitis which developed showed tuberculoid granulation tissue similar to that seen in sarcoid. The patient still had a negative tuberculin reaction, showing that the inflammatory reaction provoked by B.C.G. was of the sarcoid type but the patient did not develop or overcame tuberculin sensitivity. These facts were in support of a positive anergy in sarcoid.

The degree of allergy as well as the state of immunity have been used as explanations for the type of cutaneous tuberculosis that a patient may develop, but a careful examination of the facts pertinent to these conditions does not explain why one person has lupus vulgaris while another develops a different form of tuberculoderm. There seems to be a fair degree of uniformity in the amount of allergy and immunity accompanying the different forms of cutaneous tuberculosis, but that does not explain the reason for their presence. Nor does the presence or absence of allergy allow one to sharply differentiate types which do not have the classical characteristics of a well recognized form.

The development of a positive tuberculin reaction, its persistence or even its loss must be looked upon as a phenomenon of allergy and not as an indicator of resistance.

If one looks upon almost all forms and cases of cutaneous tuberculosis as secondary to an internal focus, then the type which is present in a given patient has developed as such because of many factors, and the degree of allergy probably plays a very small role in determining the type. The degree of allergy, however, may be a deciding factor in the life cycle of a particular lesion, in the speed of its evolution and regression, and may to some degree determine whether or not the draining lymphatics become involved.

The protective mechanism which is provoked when the skin is involved apparently does not have any influence on the degree of allergy that the entire system possesses even though tuberculin reactions in the vicinity adjacent to cutaneous tuberculosis may be more intense than those on parts more removed from the diseased portion. In spite of oft repeated statements that cutaneous tuberculosis raises the resistance of the individual to internal tuberculosis there are no proofs for this. It is much more likely that patients who develop benign skin tuberculosis belong to groups who possess native resistance brought about in many ways and that environmental factors probably play a very important role indeed as evidenced by the geographic distribution of cutaneous tuberculosis.

Note: Because of the nature of this communication, authors were not cited but quotations have been freely made from the writings of Long, Clauson, Lurie, and others.

Eosinophilic Leukemia*

With Case Report

R. O. Goehl, M.D.
Grand Forks, North Dakota

THERE are a number of conditions or diseases of man which may be associated with a great preponderance of eosinophiles in the blood stream. Among these are parasitic diseases, so-called allergic disorders, diseases of the skin, carcinoma or sarcoma, lymphogranulomatosis, and certain familial cases in which eosinophilia is striking.

"Since leukemia was discovered, about one hundred years ago, by Craigie, by Bennett, and by Virchow (1845), only minor features have been added to the clinical picture. Hematologically and histologically, however, cases of this nosographic group have been divided subsequently into different and well characterized forms. Newman (1870) recognized that in certain forms of leukemia the bone marrow is the site of typical changes, and this divided the leukemias into two main classes, the myeloid and the lymphatic. In 1913 Reschad and Schilling described the monocytic leukemia as a third form. Further, from 1912 (Stillman) several instances have been described of a leukemia-like disease in which the blood picture is dominated by an enormous increase in the number of eosinophile cells." Opinions have differed as to the interpretation of this blood picture, but in general it may be said that the features of these cases suggest that they are to be considered as a form of leukemia that involves almost exclusively the eosinophile cells, thus "eosinophilic leukemia."

The available literature indicates the rarity of "eosinophilic leukemia." It is of interest, therefore, that a case of this disease be reported with the thought of keeping anew the idea that this condition is yet open for further investigation.

Case Report

The patient, a male aged 18, was first seen September 6, 1939, when he was sent to the hospital. He had always been very well until two or three weeks previously when he began having weakness, dizziness, anorexia, abdominal pains with some looseness of his bowels, and the last few days he noticed that he was jaundiced. There was *no family history* of jaundice or blood dyscrasia.

On physical examination he was found to have a slightly icteric pale appearance with some tenderness in his upper right abdominal quadrant. The spleen was not palpable; there were no glands enlarged other than some question of left axilla, and no mouth lesions present. Temperature varied from 99 to 101.8 and pulse around 100 to 110. Blood pressure was 128/80. Other physical examination was negative.

Urine was negative except for bile; the icterus index was 59. Blood count on September 6 was as follows: hemoglobin 63 per cent; red blood count 3,000,000; white blood count 159,000 with 82 per cent mature eosinophiles, 6 per cent lymphocytes, 5 per cent neutrophiles, and 5 per cent eosinophile myelocytes, one large mononuclear and one basophile. According to Dr. Downey's examination of the smears, there was some immaturity in the neutrophile series and a slight absolute increase of basophiles. During the patient's stay in the hospital (from September 6 to September 15) his hemoglobin dropped further and two 500 cc. blood transfusions were given. At the time of his discharge, September 15, 1939, his subjective symptoms had disappeared, his hemoglobin improved to 74 per cent, and his white blood count decreased to 64,500 with 70 per cent eosinophiles. No medication was given other than some small doses of Fowler's solution.

From September 15, 1939, until three days before readmission, June 2, 1940, he was symptom-free and his white blood count decreased to 7,900 with only 5 per cent eosinophiles and no myelocytes; hemoglobin 98 per cent and red blood count 5,180,000 on December 9, 1939. Three weeks before his second and final exacerbation his white blood count was 14,400 with 44 per cent eosinophiles.

On June 2, 1940, he was again admitted to the hospital with the same symptoms as above mentioned, except that he also had pain in his chest. On physical examination there were no significant findings other than the icterus, some elevation of temperature, and some tenderness on the right side of his chest posteriorly. No adenopathy. During his seven days in the hospital his temperature and pulse became progressively higher, his temperature being of a spiking nature and going as high as 104°. His icterus became unusually severe. He was given symptomatic treatment, plus three 500 cc. blood transfusions (without reactions) and intravenous dextrose solution. He died on June 8, 1940.

The laboratory data was as follows:

Urine—negative at first; later showed 1+ albuminuria, 4+ bile and some casts.

Blood—Hemoglobin 81 per cent on admission, June 2, 1940, which dropped to 33 per cent in five days, indicating marked blood destruction in spite of two blood transfusions. Red blood count of 4,320,000 dropped to 1,570,000 in the same few days. White blood count of 190,900 fell to 83,000. Icterus index 166 to 594. Vandenburg gave a direct reaction. Fragility slight at 36; complete at 28. Prothrombin time (Howell) 6 minutes. Platelet count 360,000 on June 8, 1940. Differential count: the eosinophile count varied from day to day, the highest being 88 per cent on day of the patient's admission to the hospital. At this time only 1 to 2 per cent myelocytes present. There were many nucleated red cells present the last few days when the anemia became severe.

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*From the Grand Forks Clinic, Grand Forks, North Dakota.

Postmortem Examination

White male, age 19, 5 feet 8 inches tall, was moderately emaciated, and deeply jaundiced. Superficial nodes were not enlarged. There were no other external changes of note.

All organs of both viscera were found in their normal position and location. Heart and lungs were normal.

Liver border was at the costal margin in the mammary line and 8 cm. below the tip of the xyphoid process. It weighed 2819 grams and was yellowish dark gray in color. Spleen was enlarged and dark bluish gray in color. Its weight was 622 gms. Nodes about the duodenum and common duct were markedly enlarged; so were also the mesenteric nodes. The lower two feet of the ileum were slightly bluish on the surface and the mucosa diffusely hemorrhagic. The lumen was filled with purplish blood, partly clotted. Feces were slate gray in color.

Histological examination of the spleen showed marked eosinophilic myeloid hyperplasia with also a marked increase in the reticulum. Many myeloblasts, eosinophilic promyelocytes, and mature myelocytes were seen throughout. Splenic corpuscles were diminished but present. Sinuses were much distended. Similar changes were seen in the lymph nodes. Follicles were seen but were less prominent. There were also eosinophilic leukemic infiltrations in the liver, kidneys, and lungs. In addition the liver contained bile thrombi in the bile capillaries. Marrow preparation was unsatisfactory but it could be seen that there was a preponderance of eosinophiles.

Discussion

As one can summarize from the available literature, the salient diagnostic criteria of eosinophilic leukemia are extremely high white cell counts, an unusually large percentage of eosinophiles, absence of an etiologic factor to account for the blood picture, a high basal metabolic rate, usually splenomegaly and enlarged lymph glands, and evidence of an infiltration of the blood forming tissue with a predominance of eosinophiles. The eosinophiles in the peripheral blood and tissues are mostly of the adult type. There is, however, a great point of issue among students of this condition as to whether or not a more predominant myeloblastic picture is necessary to call this a leukemia. In this case most of the eosinophils were mature cells, many of them with hypersegmentation of the nucleus.

Up to 1939 Thomsen and Plum[11] summarized 15 reported cases of possible eosinophilic leukemia. Since that time Lepak and Reye have each reported a case. Of these 17 cases, Stephen's report is the only one that shows a significantly high proportion of eosinophilic myelocytes, except for the myeloblastic phase of the case of Thomsen and Plum.

In the case that I am reporting, all known etiologic factors seems to have been ruled out. Even a possible familial status is lacking. There are some features to point out in this case. The fulminating nature of the patient's last episode with the severe and rapid blood destruction, and the extremely severe icterus are unusual. There was the high mature eosinophile count and very little of the myeloblastic element. No adenopathy and splenomegaly was present on physical examination, but postmortem examination revealed their presence in some degree.

On the basis of present knowledge, it would seem logical to diagnose this case as one of eosinophilic leukemia. Too little is known about the eosinophile cell for one to be dogmatic. Some of the cases are not clear and their leukemic nature may be debated, but it is clear that this subject needs further study. Perhaps after more cases are thoroughly studied and reported a better evaluation of the syndrome may be concluded.

Bibliography

1. Bass, Murray H.: Eosinophilic leukemia, Am. J. Dis. Child. 41:1392-1402 (June) 1931.

2. Downey, Hal: Handbook of Hematology, New York, Paul B. Hoeber, 1938; 181-219. (Also personal communication).

3. Forkner, Claude E., et al: Eosinophilocytic or eosinophilic myelogenous leukemia, Chinese Med. J. 51:609-618 (May) 1937.

4. Harrison, F. F.: Eosinophilia with splenomegaly, Am. J. Med. Sc. 179:208, 1930.

5. Lepak, J. A.: Eosinophilic leukemia or myelogenous leukemia with eosinophilic hyperleucocytosis, Minn. Med. 23:596-600 (August) 1940.

6. McCowen, G. R., & Parker, H. B.: A case of acute eosinophilic leukemia, J. Royal Naval Medical Service 18:131 (April) 1932.

7. Morgan, Wm. Gerry, et al: An unusual case of eosinophilic leucocytosis, J.A.M.A. 110:952, 1938.

8. Reye, Douglas: A case of acute eosinophilic leukemia, M. J. of Australia 2:156-157 (Aug.) 1940.

9. Sala, M. Angelo, and Stein, Robert J.: A case of carcinoma of the cervix with a blood picture simulating chronic aleukemic eosinophilic leukemia, Am. J. Cancer 29:125 (Jan.) 1937.

10. Stephens, D. J.: Acute eosinophilic leukemia, Am. J. Med. Sc. 189:387 (March) 1935.

11. Thomsen, Stig, and Plum, P.: Eosinophilic leukemia, Acta Medica Scandinavica 101:116, 1939.

12. Eosinophilic leukemia, Editor's note J.A.M.A. 107:1741-1742 (Nov. 21) 1936.

Chest Leads in Coronary Occlusion

J. Bailey Carter, M.D.†
Chicago, Illinois

SOON after the re-introduction of chest leads by Wolferth and Wood[1], in 1932, it became evident that in many coronary occlusion curves chest leads simply magnified diagnostic changes already present in the three standard leads. With their more frequent use this fact became more evident. The tendency to attach undue diagnostic importance to chest leads has been challenged[2] and decried.[3,4] A critical review[5] of the early literature,[1,6-11] indicates the unwarranted enthusiasm for and over-emphasis of the value of chest leads arising from a failure to recognize and grasp equally significant changes in limb leads. The more recent literature, tempered as it is by experience, gives one the unavoidable impression that undue enthusiasm persists.[12-14]

An analysis of a series of coronary occlusion curves to determine how frequently chest lead changes indicate infarction, in the absence of diagnostic limb lead changes, has not been reported. Such information is essential if the proper perspective regarding the relative value of the two types of leads is to be maintained.

During a five-year period, ending September 1, 1940, 4,351 graphs were recorded on 3,879 private patients referred for electrocardiographic examination. From this group 668 records, representing 350 coronary occlusions, in 345 patients, were selected for study. Only patients having definite electrocardiographic evidence of occlusion were included.[15] Hence, this number does not represent the incidence of occlusion in the series. However, care was taken to include any electrocardiograms in which chest lead findings alone established a diagnosis of occlusion.

All graphs were made with the patient in the recumbent position.[16,17] The three limb leads were first recorded. Chest leads were obtained by transferring the left arm electrode to the left fifth interspace at the midclavicular line; lead wire connections remaining undisturbed.[18] Lead I and Lead III, on the control board, were selected in succession. A right arm to precordium and a standard Lead V chest lead were thereby recorded.[5] In the midst of this survey the recommendations of the American Heart Association for standardization of precordial leads appeared.[19] It was not considered wise, however, to change our chest lead technic. Until then the original Leads IV and V‡ of Wolferth, identical in appearance,§ had been the most widely used chest leads. Hence, we used Lead V as a check on the newer (right arm to precordium) chest lead. According to new terminology, this new lead became a CR_4 and Lead V, an inverted CF_4, continued to serve its useful purpose.

In most instances, it was important that a graphic diagnosis be made as early as possible. In each case, an attempt was made to determine, if possible, from the first record, evidence sufficient to warrant one of the following conclusions: recent acute occlusion, with ST interval displacement; remote acute occlusion, without ST interval displacement; probable occlusion; possible occlusion or absence of evidence of recent or remote occlusion; the patient being thereby eliminated from this group of cases. If history or graphic findings were suggestive, without being definite, another record, at proper interval, for comparison, was advised.

Chest leads, without abnormality, were considered normal, regardless of the abnormality present in limb leads. Chest leads were said to magnify if dependable evidence of occlusion was definitely present in the limb leads, regardless of the degree of abnormality present in the corresponding chest leads. These, along with the cases in which chest leads were normal, constitute a group in which chest leads were considered to be of no assistance in establishing the diagnosis of coronary occlusion. Chest leads were considered helpful in those instances in which, although significant limb lead changes were present, they were of minor degree; the chest lead abnormality making possible an early working diagnosis. Chest leads were considered essential in those instances in which no dependably significant limb lead changes were present; the chest lead alterations being sufficiently definite to warrant an early diagnosis without awaiting serial curves.

Of the 345 patients, 274 were male and 71 were female. One was age 27; 6 were 30-40; 78 were 40-50; 137 were 50-60; 90 were 60-70; 34 were 70-80, the remaining patients being 83, 85, 87 and 88 years old. Of these 148 were at home, 104 were hospital patients, while 98 were ambulatory at the time of the initial record. An occlusion was suspected in most instances.

Of the 350 coronary occlusions, 182 patients had only one record; 100 had 2; 32 had 3; 14 had 4; 12 had 5; 3 had 6; 2 had 7; 3 had 8, and 2 had 9 records at varying intervals following the accident. Of the 350 graphs diagnostic of occlusion, 186 were of the T_1 type; 112 of Q_3T_3 type; 22 of Q_1T_1 type; 14 of T_3 type, while 6 represented lateral infarctions and 10 could not be classified.

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†Assistant clinical professor, department of medicine, Rush Medical College of the University of Chicago; professor of medicine, Cook County Graduate School of Medicine, Chicago.

‡In recording Lead IV[1] the electrodes were applied to the anterior and posterior surfaces of the chest wall, at the cardiac level, definitely to the left of the midline. The anterior electrode was connected to the right arm lead wire and the posterior electrode to the left arm lead wire. Since the proximal electrode dominates the curve, and change in position of the distal electrode effects the contour of the chest lead but little, it was found that the distal electrode could be more conveniently applied to the left leg (Lead V), the right arm lead wire still being connected to the precordial electrode.

§In a normal Lead IV or Lead V (inverted CF_4) the P wave is inverted and shallow; the Q wave is prominent; the QRS complex is diphasic and large; the ST interval has practically no isoelectric period; the T wave is large and inverted. A normal CR_4 is usually of similar contour except corresponding deflections are oppositely directed, polarity of the primary electrode being reversed.

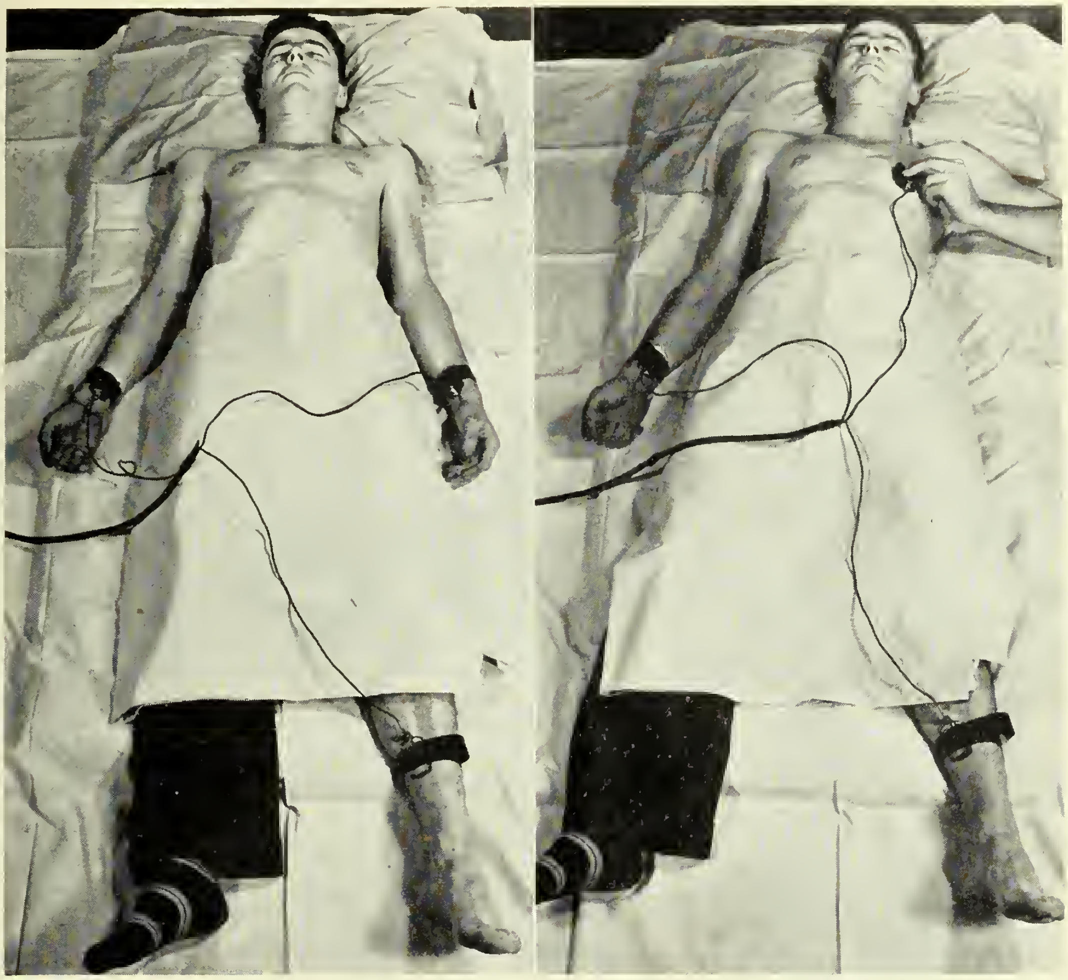

Fig. 1.

(A)—Routine technic for recording limb leads. (B)—Simplified technic for recording chest leads.

Chest leads were normal following occlusion in 128 patients; 29 of T_1 type; 84 of Q_3T_3 type; 3 of Q_1T_1 type, while 4 were lateral infarctions and 8 were unclassified. There were 222 records in which the chest leads were abnormal. Of these, 193 magnified diagnostic changes already present in the corresponding limb leads. Of the latter group, 184 were of no assistance in diagnosis. In 29 instances chest leads were abnormal without diagnostic changes being present in the corresponding limb leads, and hence were of diagnostic assistance. In 9 instances, in which chest leads magnified limb lead changes, they were helpful, since the limb lead changes were not sufficiently marked to be dependably diagnostic.

In 312 instances, chest leads were of no assistance in establishing this diagnosis. In 19 instances they were essential and in 19 instances helpful in making an early diagnosis. In 332 instances a working diagnosis was made from the first record. In 18 cases, serial curves were essential to definitely establish the diagnosis of coronary occlusion.

It is important that it be understood that in each case dependably diagnostic graphic changes of coronary occlusion were present, although these changes were not marked in every instance. If diagnostic changes were not present in the original record they were present in subsequent curves. Only cases with dependable graphic evidence of occlusion were included in this series. The frequency of occurrence of the various graphic changes concern only the present series of cases.[15] Reports of similar series may vary, depending upon the knowledge and experience of the individual interpreting the graphs, as well as the thoroughness with which he detects and analyzes abnormalities present. If inexperienced, if variations are minor or if the examination of the record is cursory, significant alterations may be readily missed. In such instances, chest leads assume additional importance. Since they so frequently magnify diagnostic changes already present in the standard limb leads, they lend additional assurance that such changes will not be overlooked by the inexperienced observer in interpreting an electrocardiogram. He will not be so likely to overlook the marked chest lead change as to miss the corresponding, less marked, abnormality present in the limb leads. Two chest leads are justified since significant change,

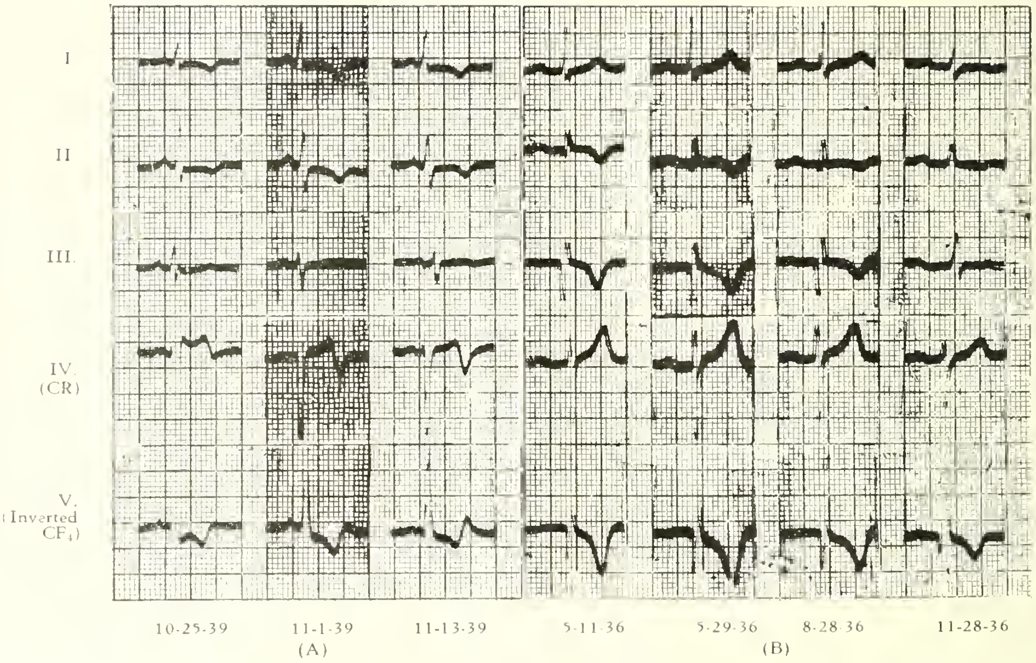

Fig. 2.

(A) Early and late T_1 type occlusion curves. Note that chest lead changes simply magnify diagnostic alterations in the limb leads.

(B) Early and late Q_3T_3 type occlusion curves. Note the absence of chest lead change.

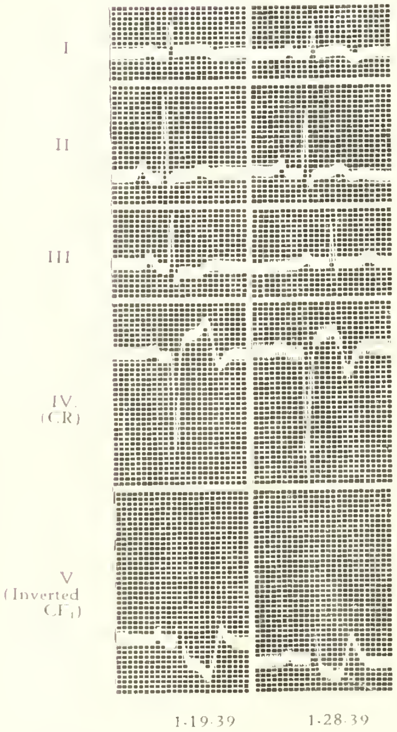

Fig. 3 Chest lead changes, although marked, are of no assistance, since limb lead changes in the initial record are diagnostic of anterior apical infarction.

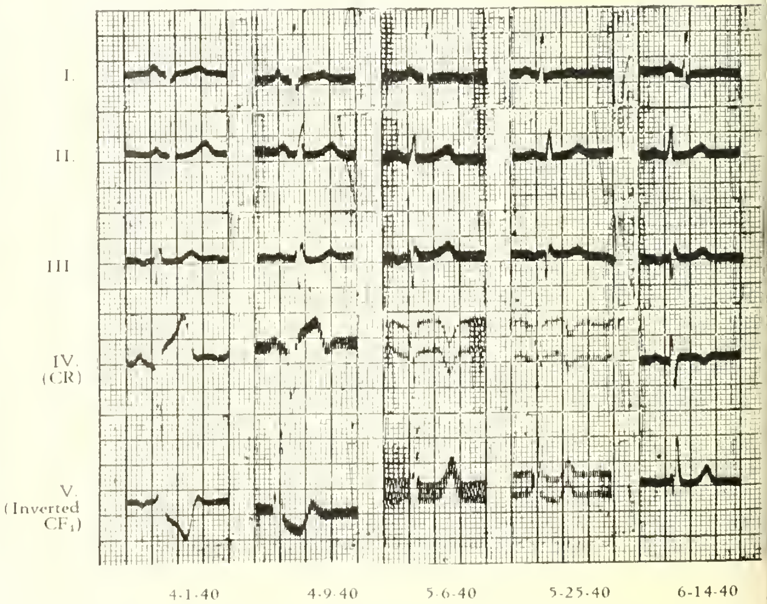

Fig. 4. Chest leads, at times, are essential for the early diagnosis of occlusion. Otherwise, the diagnosis of anterior infarction could not have been established until after the third record

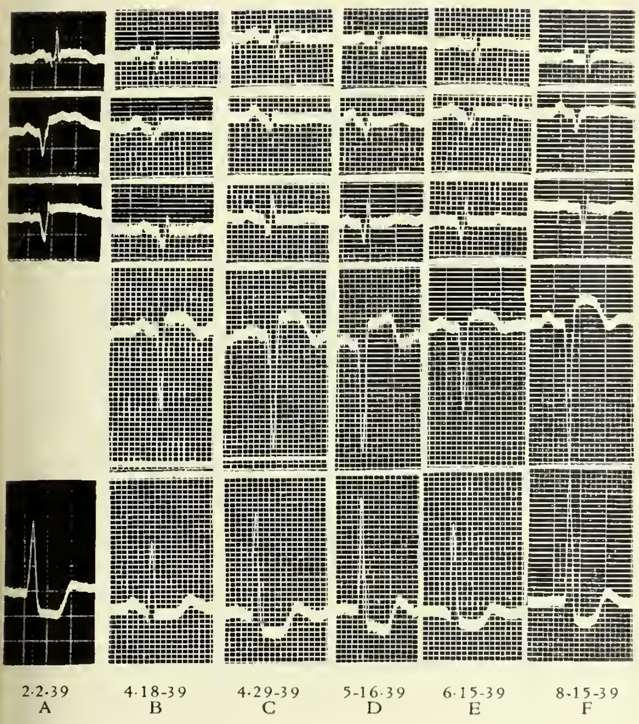

Fig. 5. (B) This being the first record available, chest leads were of definite diagnostic assistance. (A) A previous graph, recorded elsewhere and obtained later, was confirmatory. C, D. E, and F are subsequent curves.

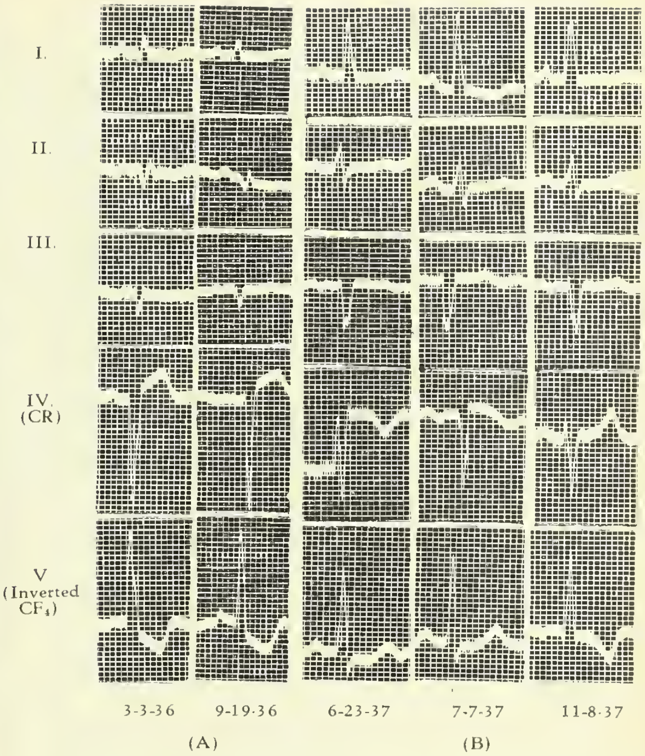

Fig. 6 (A) Serial curves in which chest lead changes, although marked and confirmatory, were of little assistance, since limb lead alterations of the initial record, although minor, were diagnostic of anterior apical infarction. (B) Serial curves in which chest lead changes were of definite diagnostic assistance.

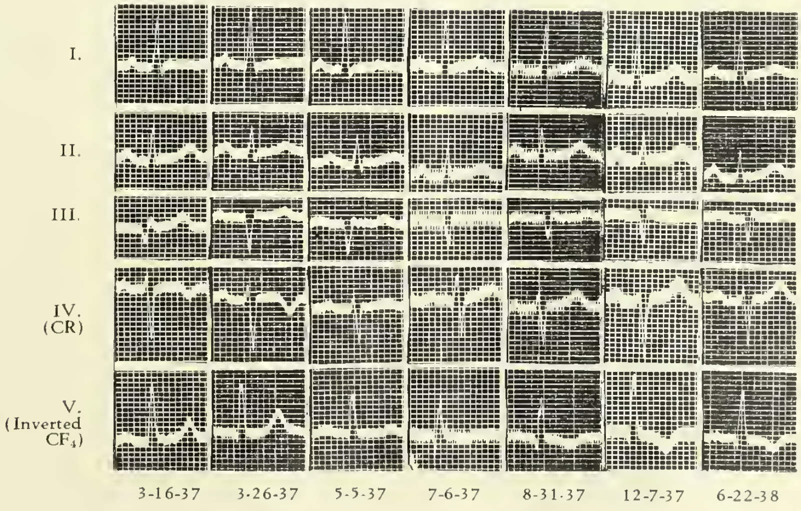

Fig. 7. Serial curves of an anterior apical infarction. Changes in Lead V, of the initial record, were a definite aid to early diagnosis.

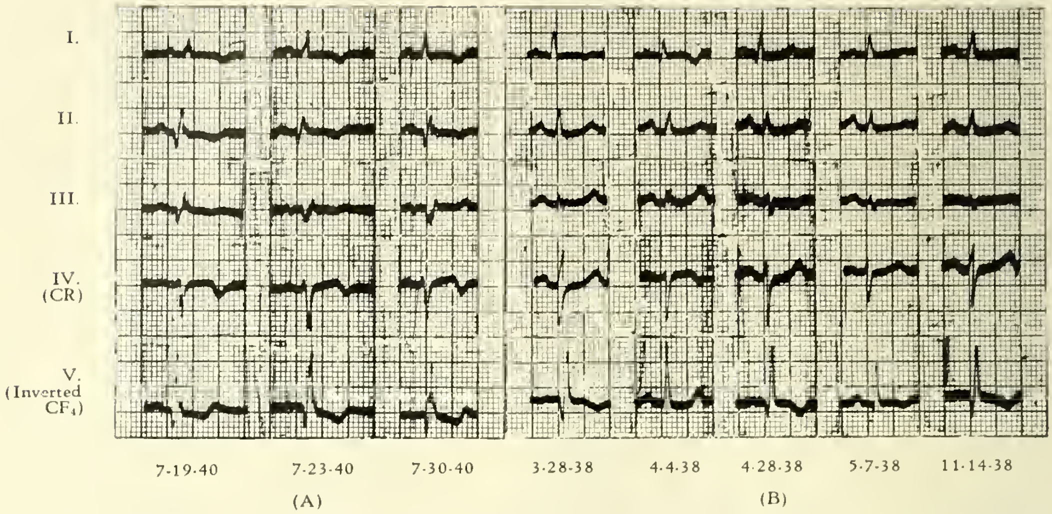

Fig. 8. Serial curves of two cases of anterior apical infarction. Note typical limb lead changes and atypical (A) absent (B) chest lead alterations in the initial record of each series.

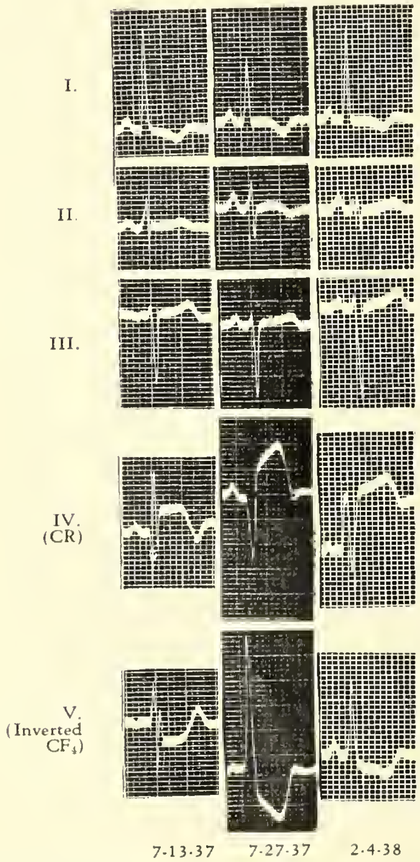

Fig. 9. Here chest leads are again essential for early diagnosis. Note their unusual contour in serial curves.

absent in one, may occur in the companion chest lead. They, likewise, are of value as a safeguard against faulty technic or interpretation of a single chest lead.

It is suggested that those interested in increasing their ability to correctly interpret graphic abnormalities, particularly those associated with myocardial infarction, should carefully study and thoroughly analyze the three standard leads for significant alterations before permitting themselves to view corresponding abnormalities in chest leads. By so doing, their attention will be focused more directly and profitably on limb lead changes; their dependence on chest lead changes, as a crutch, will decrease; their diagnostic acumen being thereby increased.

If chest leads are to be of assistance in diagnosis, it is essential that a dependable technic be employed.[18] Unfortunately, this is not true of all chest leads now in use.[3,4] A thorough knowledge of the normal and abnormal variations of the chest leads employed is likewise important. With failure to thoroughly recognize these facts, chest lead changes may grossly mislead.[3] This is particularly true of the case in which diagnostic limb lead changes are minor or absent. In such instances great care must be taken not to attribute undue significance to chest lead changes. Interpretation of their importance should be extremely conservative, especially if these changes are minor. On the other hand, minor or absent chest lead changes in the presence of dependable limb lead abnormalities should not cause one to hesitate to make a diagnosis of coronary occlusion with or without myocardial infarction.

Summary

In the majority of instances chest lead abnormalities

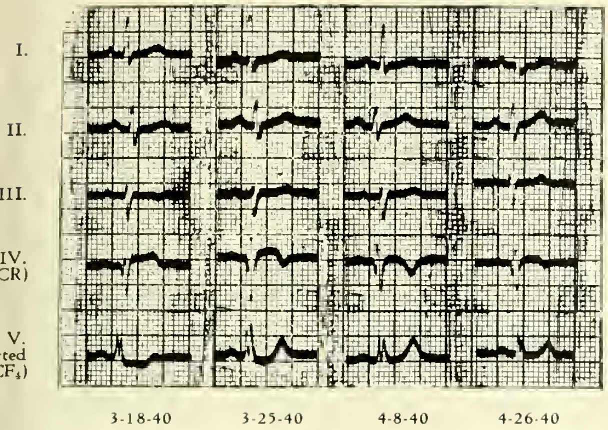

Fig. 10. Diagnosis on the basis of chest lead changes in the initial record is confirmed by variations in serial curves. Diagnosis from limb lead serial curves alone would not have been possible.

simply magnify diagnostic changes already present in limb leads.

In many cases chest leads are normal in the initial graph following an occlusion and remain normal in subsequently recorded curves. At times they are helpful and in certain instances essential for the early graphic diagnosis of coronary occlusion.

Conclusion

Chest leads are essential in a certain small percentage of instances of coronary occlusion. Their limited usefulness emphasizes the importance of careful study and meticulous analysis of the three standard leads for significant, although minor, abnormalities, since these, if detected, are frequently just as diagnostic of an occlusion as is the more marked chest lead changes.

Bibliography

1. Wolferth, C. C., and Wood, F. C.: The electrocardiographic diagnosis of coronary occlusion by the use of chest leads, Am. J. M. Sc. 183:30 (Jan.) 1932.

2. Barnes, A. R.: Discussion, Am. Heart J. 10:409 (Feb.) 1935.

3. Barnes, A. R.: Electrocardiographic Patterns, Springfield, Charles C. Thomas, 1940.

4. Scherf, D., and Boyd, L. J.: Clinical Electrocardiography, St. Louis, The C. V. Mosby Company, 1940.

5. Roth, I. R.: On the use of chest leads in clinical electrocardiography, Am. Heart J. 10:798 (Aug.) 1935.

6. Levin, L.: Chest leads in the diagnosis of coronary occlusion, M. J. & Rec. 136:421 (Nov.) 1932.

7. Ross, C. W., and Ferguson, D.: Electrocardiographic evidence of recent coronary occlusion, with specific emphasis on the use of the anterior-posterior chest lead, U. S. Nav. M. Bull. 30:366 (July) 1932.

8. Hoffman, A. M., and Delong, E.: Standardization of chest leads and their value in coronary thrombosis and myocardial damage, Arch. Int. Med. 51:947 (June) 1933.

9. Lieberson, A., and Liberson, F.: The value of the posterior-anterior chest lead in cardiac diagnosis, Ann. Int. Med. 6:1315 (April) 1933.

10. Katz, L. N., and Kissin, M.: A study of Lead IV; its appearance normally, in myocardial disease, and in recent coronary occlusion, Am. Heart J. 8:595 (June) 1933.

11. Goldbloom, A. A.: Clinical evaluation of Lead IV (chest leads); a survey of Lead IV in ambulatory cases of coronary artery disease and acute coronary occlusion, Am. J. M. Sc. 187:489 (April) 1934.

12. Bohning, A., and Katz, L. N.: Four lead electrocardiogram in cases of recent coronary occlusion, Arch. Int. Med. 61:241 (Feb.) 1938.

13. Wood, P., and Selzer, A.: Chest leads in clinical electrocardiography, Brit. Heart J. 1:49 (Jan.) 1939; Abstr., Am. Heart J. 18:125 (July) 1939.

14. Wolferth, C. C., and Wood, F. C.: The prediction of differences between precordial leads CR, CL, and CF, based on limb lead findings, Am. Heart J. 20:12 (July) 1940.

15. Carter, J. B.: Graphic changes in coronary occlusion, Illinois Med. J. 80:485 (Dec.) 1941.

16. Sigler, L. H.: Electrocardiographic changes occurring with alterations of posture from recumbent to standing positions, Am. Heart J. 15:146 (Feb.) 1938.

17. Ylvisaker, L. S., and Kirkland, H. B.: The significance of the position of the subject in the evaluation of the electrocardiogram, Am. Heart J. 20:592 (Nov.) 1940.

18. Carter, J. B.: A simplified chest lead technic for routine clinical use, M. J. & Rec. 155:252 (April) 1942.

19. Standardization of precordial leads, Am. Heart J. 15:107 (Jan.) 1938; J.A.M.A. 110:395 (Jan. 29) 1938.

Is There an Intestinal Parasite Problem in College Students?*

Ernest Carroll Faust, Ph.D.†
New Orleans, Louisiana

SURVEYS for intestinal parasites have been conducted on large samplings of rural populations in the South during the past quarter century, primarily to determine the incidence and intensity of hookworm infection. In more recent years, similar investigations on ascariasis in pre-school and primary-school groups have been carried out by helminthologists, epidemiologists and public health workers. The only comparable data on amebiasis and other protozoan infections of the intestinal tract have resulted from the intensive studies of Meleney and his colleagues in Tennessee. In addition to the above records there are those obtained from clinic and hospital populations, based on routine fecal examinations, and special surveys of children's homes, institutions for the insane, and food handlers. With few isolated exceptions college students have not been similarly examined, possibly due to lack of appreciation of the need for such examination or possibly due to a belief that college students are not infected. Yet most college students come from the rank and file of the general population, although for the most part from homes which are more sanitary and in which personal hygiene is more consistently practiced than in the average rural home or that of the ambulatory charity patient.

On the basis of varied surveys throughout the United States and Tropical America, there is consistent evidence indicating that ascariasis, seatworm and dwarf tapeworm infections and giardiasis are more prevalent in small children, including those of the pre-school and primary-school groups, while older children and young adults are more commonly the hosts of hookworm and whipworm infections. Infection with amebae, including the pathogenic species *Endamœba histolytica,* is relatively uncommon in infants, but constant exposure allows these infections to be built up gradually, so that the highest percentage incidence in any particular population group is found in adult life. The more prevalent a particular infection is in a group and the more intimately the individuals of the group are associated with one another, the more likely is the infection to extend into the lower age levels.

In general, higher incidences of infection as well as more intense infections with intestinal parasites may be expected in warmer than in cooler climates, but certain epidemiological factors may supervene to alter the picture. Ascariasis and amebiasis are much more frequent in the populations of the southern Appalachian and Piedmont regions than they are along the Gulf coast. Hookworm infection is most common in areas with a sandy humus soil. Giardiasis and seatworm infection frequently saturate the population of congested children's homes and may be equally common in institutions for the insane or feeble-minded. The relatively common incidence of dwarf tapeworm infection in the Southeastern United States and its infrequent occurrence elsewhere in North America are not at present subject to reasonable explanation.

One additional general statement deserves consideration before proceeding with the subject in hand. With a few minor exceptions the intestinal parasites of man in the United States are contracted from previous human infections. Other animals which might serve as reservoirs are epidemiologically unimportant. In other words, man is the source of his own infections.

From a practical standpoint, two questions must be answered before the subject of this paper can be adequately considered. These are:

1. Do college students harbor intestinal parasites?
2. If these parasites are present, are they of clinical and public health importance?

PRESENTATION OF SURVEY DATA

In order not to isolate the survey records of college groups from those of the communities in which they live, tabulated comparisons have been made, wherever possible, between the intestinal parasites in representative samplings of the general population and of college students. Three such comparisons are available, namely: in the Tennessee-Kentucky area, in Georgia and in New Orleans. Furthermore, in order to demonstrate the appreciable incidence of intestinal parasites in college students and at the same time to show the different percentages of infection in different geographical areas, it is desirable to tabulate as a group the available records on intestinal parasites for college groups.

The information on the Tennessee-Kentucky area is summarized in table I. The information on the Georgia area is summarized in table II. The information on the New Orleans area is summarized in table III. Comparative information compiled from representative college groups is presented in table IV.

In connection with the tabulated data just presented, it will be enlightening to examine the data obtained in 1938-1939 by the staff of the Department of Tropical Medicine of Tulane University from examination of the stools of senior medical students. From each of 91 individuals of this group, six consecutive stools were obtained and were examined by direct fecal films (both unstained and iodine-stained) and by the zinc sulphate centrifugal floatation technic. Only three of the seven *E. histolytica* infections discovered were diagnosed by the direct fecal films, while all of these three, and four additional ones,

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*Read before the joint session of the Southern and Mississippi Valley Sections of the American Student Health Association and the Southern Medical Association, Louisville, Kentucky, November, 1940.

†Professor of parasitology, department of tropical medicine, Tulane University of Louisiana.

TABLE I.

Intestinal Parasites in the Tennessee-Kentucky Area, Figured in Percentage.

	Tennessee (rural) 15-19 yr. group, white (Meleney, Bishop & Leathers, 1932)	Tennessee (rural) 15-19 yr. group, white (Keller & Bishop, 1932)	Vanderbilt Univ. Med. Students, white (Meleney, personal communication)		E. Kentucky (rural) 15-19 yr. group, white (Keller & Leathers, 1936)	Berea College, Ky., 16-20 yr. group, white (Headlee, personal communication)
PROTOZOA			(1 stool)	(6 stools)		
E. histolytica	15.3	Survey not conducted for protozoan infections	3.5	4.4	Survey not conducted for protozoan infections	5.0
E. coli	35.8		17.7	23.3		49.4
Endolimax nana	13.8		12.1	12.8		43.8
I. bütschlii	4.5		2.7	3.3		10.7
Giardia lamblia	7.7		3.7	5.0		6.1
Chilomastix	2.3		2.2	2.8		1.0
HELMINTHS						
Ascaris	Survey not conducted for helminth infections	21.8		0.5	27.1	5.2
Hookworm		8.6	0.7	0.8	14.1*	14.7
Trichocephalus		6.4		0.6	9.3	7.6
Strongyloides						3.8
H. nana		1.8		0.5	2.4	2.7
Total persons examined in age group	1299	ca. 2,000	371	180	ca. 2,000	1,539

*Keller, Leathers & Jensen, 1935.

TABLE II.

Intestinal Parasite Incidence in Certain Georgia Surveys, Figured in Percentage.

	Georgia Dept. of Health Labs. Annual Report, 1939. Total Routine Exams.	Georgia Relief Rolls (Athens) (Byrd, 1936)	Georgia State University Freshmen (Byrd, 1937)
PROTOZOA			
E. histolytica	No protozoan findings in report	6.1	5.2
E. coli		25.8	24.5
Endolimax nana		21.9	20.0
Iodamœba		1.5	2.6
Giardia		5.4	8.4
Chilomastix		0.7	0.7
Trichomonas			0.3
HELMINTHS			
Ascaris	1.05	0.18	0.1
Hookworm	27.7	0.56	3.0
Trichocephalus	0.1		0.3
Strongyloides		0.37	0.1
Hymenolepis nana	0.4	0.56	0.3
Total persons examined	71,283	537	729

TABLE III.

Intestinal Parasite Incidence in Certain Groups of the New Orleans Population, Figured in Percentage.

	New Orleans Ambulatory Clinic Pop. 16-20 yr. group, white, 1934-1939 (Unpublished data)	New Orleans, L. S. U. Med. Students, white (Swartzwelder, 1938)	New Orleans, Tulane Med. Students, white (Unpub. data)	
PROTOZOA			Freshm. 1935-1940	Jrs. 1937-1940
E. histolytica	9.8	3.1	2.9	4.6
E. coli	14.5	12.0	7.7	10.3
Endolimax nana	15.8	10.3	10.3	10.6
Iodamœba	1.7	1.0	0.6	0.8
Giardia	7.1	4.1	1.4	3.4
Chilomastix	0.6		0.3	0.5
Trichomonas	1.2		0.16	
HELMINTHS				
Ascaris	0.3		0.16	
Hookworm	3.0	4.8	0.6	0.8
Trichocephalus	3.3	0.3	0.6	0.3
Strongyloides	1.7	2.1		0.3
Hymenolepis nana	0.3			
Total persons examined in group	337	291	619	349

TABLE IV.
Comparative Data on Intestinal Parasites of College Students, Figured in Percentage.

	Pennsylvania College Freshmen (Wenrich, Stabler & Arnett, 1935)	Indiana Purdue University (Headlee, 1939)	Kentucky Berea College (Headlee, personal communication)	Tennessee Vanderbilt Univ. Med. Students (Meleney, personal communication)		Georgia State Univ. Freshmen (Byrd, 1937)	Louisiana L. S. U. Med. Students (Swartzwelder, 1938)	Louisiana Tulane 1st year Med. Students (Unpublished data)	Louisiana Tulane 3rd year Med. Students (Unpublished data)
PROTOZOA				(1 stool)	(6 stools)				
E. histolytica	4.1	2.8	5.0	3.5	4.4	5.2	3.1	2.9	4.6
E. coli	14.5	19.7	49.4	17.7	23.3	24.5	12.0	7.7	10.3
Endolimax nana	11.4	30.5	43.8	12.1	12.8	20.0	10.3	10.3	10.6
Iodamœba	1.0	1.4	10.7	2.7	3.3	2.6	1.0	0.6	0.8
Dientamœba	4.3								
Giardia	7.5	2.3	6.1	3.7	5.0	8.4	4.1	1.4	3.4
Chilomastix	0.94	0.5	1.0	2.2	2.8	0.7		0.3	0.5
Trichomonas					0.6	0.3		0.16	
HELMINTHS									
Ascaris		0.9	5.2		0.5	0.1		0.16	
Hookworm	Survey	0.5	14.7	0.7	0.8	3.0	4.8	0.6	0.8
Trichocephalus	not	0.9	7.6		0.6	0.3	0.3	0.6	0.3
Strongyloides	conducted		3.8			0.1	2.1		0.3
H. nana		0.5	2.7		0.5	0.3			
Total persons examined	1,060	213	1,539	371	180	729	291	619	349

were found by the zinc sulphate technic. Similarly, only seven of the eleven cases of *E. coli,* 20 of the 24 cases of *Endolimax nana,* one of the two cases of *Iodamœba,* one of the two cases of *Chilomastix,* two of the four cases of *Giardia,* two of the four cases of hookworm and no evidence of the single cases of *Trichocephalus* and *Schistosoma mansoni* (in a Puertorican) were obtained by the direct film technic. Direct hematoxylin films on the first 60 individuals of this series provided one case each of *E. histolytica, Dientamœba* and *Giardia* and four of *E. nana* not encountered by any of the other technics employed, but failed to provide diagnosis for 23 protozoan infections detected by the zinc sulphate technic. Obviously, without the use of the zinc sulphate or a comparably efficient technic, diagnosis of intestinal parasite infections in a given population group will be wholly inadequate, either for clinical or for statistical use.

DISCUSSION

In attempting to evaluate the data assembled in the four tables presented above, two facts must be borne in mind. In the first place, the technics utilized were not uniform, were not equally efficient and hence might have produced different diagnostic results on the same fecal specimen. Moreover, diagnosis based on the examination of a single stool specimen from an individual provides only partial evidence of the total parasite incidence. In the next place, the mere diagnosis of a particular infection in an individual provides no indication of the intensity of the infection. Thus, a very efficient technic might show a rather high incidence of hookworm infection in a given group without any quantitative indication of the worm burden. A survey based on this method for the detection of *Ascaris,* hookworm or *Trichocephalus,* unless accompanied by an egg-count technic, has little clinical value. This has been recognized for nearly two decades and well-conducted surveys for these helminths have replaced the centrifugation or simple brine floatation technic with an egg-count method, as the Stoll method, which provides relatively accurate information on the intensity of infection in the individual. For the less frequent cases of strongyloidiasis and dwarf tapeworm infection, accurate quantitative appraisal has not been perfected.

Diagnosis of the intestinal protozoa is on a less secure basis both qualitatively and quantitatively than is that of the common roundworms. A single technic provides inadequate information while single stool examinations give only a fraction of the total protozoan incidence. Thus, either unconcentrated iodine-stained or hematoxylin-stained films are inadequate. One or the other or both of these methods must be supplemented by a satisfactory concentration technic, as the zinc sulphate method, and must be repeated on three or more stools of the same individual, in order to approach diagnostic accuracy even in the hands of a competent worker. In so far as the writer is aware, none of the protozoan surveys conducted on college groups has approached this goal and very few surveys of other population groups have attained it.

For all practical purposes, the only protozoan parasite of clinical and public health importance is the tissue-invading *Endamœba histolytica.* The discovery of a single specimen of this organism in human feces indicates either immediate or potential danger to the host or his associates. Unlike the common roundworms, this ameba multiplies within the body of its victim like the organisms of bacillary dysentery, and unlike *Ascaris* or hookworms, it is immediately infective for other individuals who may innocently ingest the cystic stage. *Ascaris,* hookworm, *Strongyloides* and tapeworm infections should always be regarded as clinically important, and at times *Trichocephalus* and the seatworm produce symptoms of clinical grade.

In all of the college groups surveyed, *Endamœba histolytica* has been found in appreciable amount, and it may be conservatively estimated that the number of infections in each group would have been doubled had more thorough and more adequate examinations been made. Most of the diagnosed cases have been apparently symptomless carriers, although some have been manifestly ill with amebic infection. Moreover, as Craig (1932) has so frequently emphasized and as Connell and French (1939) have recently demonstrated for a college group, treatment of all diagnosed carriers with amebicidal drugs results in evident improvement in both physical and intellectual capacity.

The value of eradicating moderate to large numbers of worms from the infected individual has been demonstrated so frequently that it is almost axiomatic. However, the clinical improvement in patients following anthelmintic medication for light infections is also important, although the improvement is usually less dramatic. This is especially the case in *Strongyloides* infection, where fecal examination frequently fails to provide any real index of the degree of infection or of clinical involvement.

In the absence of quantitative data, it probably may be assumed that the average helminth infection in college students is light in intensity when compared with that in the surrounding population. Nevertheless, it deserves therapeutic attention until it is eradicated.

The public health importance of the discovery and eradication of intestinal parasites in college students should not be overlooked. Moreover, the college groups should not only be instructed in the ways whereby these infections are acquired but also in methods of prevention. Most of the infections are contracted in their homes. In order to combat the sources of infection, this knowledge should be carried to the home communities.

The question of seatworm infection has been purposely omitted from consideration, since routine fecal examinations provide very inadequate information on the infection incidence of the etiologic agent, *Enterobius vermicularis* (Sawitz, Odom, and Lincicome, 1939). Efficient diagnosis of this infection is based on examination of swabs made from the perianal and perineal skin (Hall, 1937) and for accuracy requires six or seven consecutive swabbings. The highest incidence is found in the pre-school group, although infection tends to be familial or institutional, especially where several persons are domiciled in the same dormitory. Treatment of individual cases is extremely unsatisfactory and except for the temporary relief of symptoms should be carried out simultaneously on all infected individuals of the group.

Conclusions

Although relatively few surveys of American college students have been made to determine the incidence of intestinal parasites in this group of the population, representative surveys in New England, Pennsylvania, Indiana, Kentucky, Tennessee, Georgia and Louisiana indicate that there is an appreciable infection with *Endamœba histolytica* in each surveyed group. In the South, intestinal helminths are also present. As a rule, the incidence of each infection in this group is considerably less than it is in representative samplings of the general population of the same localities. While none of these college group surveys has been conducted on a quantitative basis to determine the intensity of the helminthic infections, it is probable that the worm burden is considerably less than in the rural and clinic populations of the same areas.

The college student surveys included in table IV are not directly comparable, since they were not carried out with identical technics. None represents the real incidence in the groups surveyed, such as might have been more nearly detected by a combination of one of the technics used with an efficient concentration method and with repeated stool examinations of each member of the group.

Once a diagnosis of infection with *E. histolytica, Ascaris lumbricoides, Strongyloides stercoralis,* hookworms or tapeworms has been made, the infection should be treated with appropriate therapeutics until it has been eradicated. At times *Trichocephalus* and *Giardia* also are responsible for symptoms and in such circumstances should be removed. None of the other indigenous intestinal parasites of American college students, usually detected by stool examination, is known to be pathogenic. Many persons harboring *E. histolytica* or intestinal helminths are not aware of a subnormal state of health until specific medication has been carried out and they attain a state of well-being previously unknown. Medical officers in charge of college student health should welcome well-conducted surveys, and on the basis of the findings carry out thorough anti-parasitic medication. Moreover, the students should be acquainted with the most practical methods for preventing infection with these parasites.

Acknowledgement

The writer is deeply indebted to Dr. Henry E. Meleney, Department of Preventive Medicine and Public Health, Vanderbilt University Medical School, Nashville, Tennessee, and to Dr. William Hugh Headlee, Department of Biology, Purdue University, Lafayette, Indiana, for permission to use valuable unpublished information. He also desires to thank Mrs.

Antoni Sawitz for assistance in compiling data from the health records of First Year Medical Students in Tulane University.

BIBLIOGRAPHY

Byrd, E. E.: On the incidence of intestinal parasites in 537 individuals on the relief rolls in the city of Athens, Georgia, and vicinity, Am. J. Trop. Med. 16:39-45, 1936. The intestinal parasites observed in fecal samples from 729 college freshmen, J. Parasitol. 23:213-215, 1937.

Connell, F. H., and French, H. T.: The incidence and results of treatment of subclinical amebiasis, J. A. M. A. 113:649-652, 1939.

Faust, E. C., and Headlee, W. H.: Intestinal parasite infections of the ambulatory white clinic population of New Orleans, Am. J. Trop. Med. 16:25-38, 1936.

Hall, M. C.: Studies on oxyuriasis. I. Types of anal swabs and scrapers, with a description of an improved type of swab, Am. J. Trop. Med. 17:445-453, 1937.

Headlee, W. H.: Intestinal parasitism in a group of University students, Proc. Indiana Acad. Science 49:227-230, 1939.

Keller, A. E., and Leathers, W. S.: The incidence and distribution of Ascaris lumbricoides, Trichuris trichiura, Hymenolepis nana and Hymenolepis diminuta in thirty-six counties in Kentucky, Am. J. Hyg. 23:216-230, 1936.

Keller, A. E., Leathers, W. S., and Bishop, E. L.: A state-wide survey of the human intestinal helminths in Tennessee, Jour. Prevent. Med. 6:161-184, 1932.

Keller, A. E., Leathers, W. S., and Jensen, M. H.: An investigation of hookworm infestation in thirty-six counties in Kentucky, Am. J. Hyg. 23:33-45, 1936.

Meleney, H. E., Bishop, E. L., and Leathers, W. S.: Investigations on Endamœba histolytica and other intestinal protozoa in Tennessee. III. A state-wide survey of the intestinal protozoa of man, Am. J. Hyg. 16:523-539, 1932.

Sawitz, W., Odom, V., and Lincicome, D. R.: The diagnosis of oxyuriasis. Comparative efficiency of the N I H swab examination and stool examination by brine and zinc sulphate floatation for Enterobius vermicularis infection, U. S. Public Health Reports 54:1148-1158, 1939.

Swartzwelder, J. C.: A survey of the intestinal parasites of medical students, J. Parasitol 24:552-553, 1938.

Wenrich, D. H., Stabler, R. M., and Arnett, J. H.: Endamœba histolytica and other intestinal protozoa in 1,060 college freshmen, Am. J. Trop. Med. 15:331-345, 1935.

Physical Therapy in the College Health Service[*]

Richard Kovacs, M.D.[†]
New York, New York

PHYSICAL treatment methods employing the use of heat, light, electricity, massage, and exercise have made spectacular progress in the United States since the first World War. For the relief of pain and restoration of function to the injured or otherwise disabled, the combined use of these physical methods under expert medical direction has been found indeed indispensable. Following the large scale, experimental proof in the first World War, physical therapy departments were installed first in civilian reconstruction hospitals, then in industrial clinics and orthopedic hospitals, and finally in most general hospitals. Beginning with the early days of this development, high pressure sales agents have been trying to foist upon practicing physicians much complicated and expensive apparatus. As a means of educating the medical profession and defending the public, the House of Delegates of the American Medical Association in 1927 set up the Council of Physical Therapy; since that time this body has done notable work in publishing informative articles on the various physical therapy methods, in promoting controlled research, in advocating basic training in undergraduate and graduate medical schools, and finally in effectively curbing unwarranted claims and objectionable sales methods for apparatus. It is the consensus that while in expert medical hands various types of apparatus are valuable for treating a variety of cases, often complicated, nevertheless for general practitioners and smaller institutions the efficient use of the simpler and safer physical measures should be sufficient. Because practical education in an expanding field of medical practice in which not any, or very little basic training has been given, takes a long time, it is no wonder that even at this time confusion exists as to the methods of physical treatment and their field of applicability.

Physical therapy has a fertile field of employment in student health work and the great interest in it is demonstrated by the fact that, according to information kindly furnished by Dr. G. T. Blydenburgh of Ohio Wesleyan University, the special aspects of physical therapy related to student health services have been brought up at previous meetings of the American Student Health Association and some of its sections as well as at the two National Conferences of Hygiene supported by the Special Committee of Fifty of the Association of College Presidents. There are at least one hundred and twenty colleges in which physical therapy services are rendered.

It seems reasonable to approach the problem of physical therapy in college service from three aspects, all of which are intimately related: (1) What is the rationale of the application of physical therapy and which are the conditions in which special benefit is to be expected from it in college health service? (2) What are the principal physical measures which are to be employed in this work? (3) Who is to direct the selection and application of physical therapy in college health service?

(1) *Rationale of physical measures and conditions likely to be benefited.* Physical therapy is not a new system for recognizing and treating disease; it merely consists of conveying certain forms of physical energy to the body in order to bring about certain physiological

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[*] Presented at the twenty-second annual meeting of the American Student Health Association, New York City, December 30-31, 1941.

[†] Professor of Physical Therapy, New York Polyclinic Medical School and Hospital.

responses. Dean Sollman[1] states: "Although drug therapy and drugless therapy may seem direct antipodes to the superficial thinker, they involve the same principles, evoke the same phenomena, accomplish the same results. They differ only in the means which they employ, of which sometimes the one, sometimes the other is better adapted to secure the desired end. Indeed, the differences between physical therapy and pharmaco-chemical therapy are no greater than those between radiant and direct heat, or between local and general anesthetics."

There are some obvious advantages in employing physical remedies. Usually they can be directly applied to the affected parts and in acute disease conditions and injuries serve to relieve painful symptoms quickly and to speed up recovery. In chronic conditions they can stimulate function and may affect the whole system by active exercise or by nerve reflex upon deeper situated parts.

Acute traumatism appears to be the most frequent among the conditions in college health service in which physical measures are most likely to be beneficial. Gymnastics, sports as well as the natural liveliness of youth bring about a variety of bruises, muscle strains, joint sprains, fractures and dislocations. The minor injuries among these do not require hospitalization or specialist's treatment and should be easily handled by the health service after a proper diagnosis has been made of the extent of the damage. If the injury does not demand complete immobilization, the immediate application of gentle massage to the periphery of the injured part will relieve swelling; next day, while elastic bandaging or strapping may protect the parts, suitable heat measures and passive exercise, and finally, active exercise are being employed for prevention of stiffness and full restoration of function. Adequate medical supervision and skillful technic can accomplish most satisfactory results in these cases with fairly simple physical therapy equipment.

Acute catarrhal conditions of the head sinuses, the nose and throat, and the chest, or localized muscular pain in connection with these respiratory infections can be speedily and satisfactorily relieved by radiant heating or diathermy ordered after the medical diagnosis has been made. Mild cases of rheumatic affections are likewise benefited by heat measures as an adjunct to other medical treatment.

In run-down conditions, and anemia, as they occur in connection with overwork or lack of rest, and not due to serious organic disturbances, the use of ultraviolet irradiation is helpful. There is still controversy, because of a lack of generally accepted evidence, whether general ultraviolet irradiation is indicated in the prevention and treatment of common colds. Definite evidence exists about the benefits of ultraviolet irradiation in secondary anemia, however.

In some skin conditions prevalent in young people of college age, both local and general ultraviolet irradiation may be of considerable value. Among these conditions are acne, dermatophytosis, furunculosis, impetigo, psoriasis, pityriasis rosea, and also indolent ulcers. In skin blemishes, moles, and warts, the use of the high frequency current in the form of desiccation is an effective and cosmetically safe destructive measure which the college physician can easily learn to apply.

There are a number of orthopedic conditions in which physical measures administered by the college health service should be of definite value. Bad posture, round shoulders, flat feet—all are benefited by carefully prescribed and systematically applied exercise.

(2) *What physical measures should be useful in college health service?* Among the bewildering array of modern physical therapy apparatus, to which new additions are being constantly made, the only consideration should be the classification of physical measures into elementary principles of action and the selection of the simplest and safest measures which can be efficiently applied under intelligent direction.

Heat producing or thermal measures form the most extensive group of physical therapeutic agents. From the clinical standpoint the chief effect of therapeutic heating is that, locally applied, it improves circulation, speeds up repair of injured and chronically inflamed tissues, relieves pain and spasm; furthermore, general heating benefits rheumatic conditions and stimulates the defensive forces of the organism against some infections.

The three main forms of heating are (1) conductive form such as hot water, hot paraffin, hot air; (2) radiant forms as luminous and non-luminous, in both of which infrared radiation plays the major role, (3) convective: the transformation of a high frequency electric current into increased molecular vibration or heat all the way between the electrodes.

For the large majority of cases treated in college health services heat lamps should have the greatest all-around value and are the simplest and safest to apply to the majority of traumatic and catarrhal conditions. Non-luminous sources of heating, known as infrared generators, are not quite as efficient for penetration into deeper layers of the skin and to superficially located muscles and other tissues. Lamps of various sizes are desirable in order to select one corresponding to the area to be treated; heating an undesirably large area leads to overheating as well as to economic waste. Proper duration and frequency of application are essential.

The whirlpool bath offers a desirable combination of conductive heating to an extremity with gentle massage and cleansing effects; it is particularly useful in recent injuries of extremities in which there is much swelling, as well as after fractures and other immobilizations to improve the condition of a very scaly skin, in addition to the effective hyperemia. The paraffin bath may serve as an alternate conductive heating measure in chronic traumatic and arthritic conditions of the extremities.

Diathermy either of the long wave or the short wave type, results in through and through heating of a part of a body or an entire extremity and it is invaluable in deep seated subacute and chronic inflammatory conditions of bones, joints, and inner organs. Long wave diathermy enables better localized heating and the use of milliampere meter reading for amount of electric energy passing. Short wave diathermy is safer and simpler to apply and has become more popular for this reason. In inexperienced hands, however, it amounts to a glorified electric pad. For the large range of traumatic and catarrhal conditions seen in college health work the use of radiant heating should be entirely sufficient and the use of diathermy can be reserved for more extensive and stubborn conditions. The older type of spark gap machine for long wave diathermy offers the use of the monoterminal high frequency or Oudin current for electro-desiccation as already stated.

Ultraviolet irradiation from artificial sources does not fully replace all the tonic and invigorating effects of natural sunlight, yet in northern climates and winter months it is of great value in offering "bottled sunshine." In contrast to the blended effect of total sunshine, most generators furnish predominately one or another part of the ultraviolet spectrum and thus a predominance in certain physiological effects and the relative dearth of others. Carbon arc lamps come nearest to replacing total sunshine, but are more cumbersome to handle. Mercury vapor lamps of the hot quartz type furnish chiefly antirachitic and general tonic radiation. Lamps of the cold quartz type furnish a predominance of the short bactericide range and their chief applicability appears to be for local irradiation of skin conditions. There are now available relatively inexpensive small units of the latter type—such as the thin window lamp—replacing the former expensive and complicated water-cooled ultraviolet lamps.

Galvanic and low frequency electric currents play an important role in general physical therapy departments for electrophoresis of certain drugs, for electrodiagnosis, and muscle and nerve stimulation. It is doubtful whether in the average student health service there is need for such equipment and there is available the necessary skill and time for its employment. The same considerations prevail as to elaborate hydrotherapeutic equipment in the form of a control table for showers and douches, sitz baths, steam baths, and electric cabinet baths. They are useful in hospital work and also for so-called health conditioning, but the expense of their installation and proper administration appears to be beyond the scope of student health service.

Mechanical measures form an indispensable part of most physical therapy procedures directed toward treatment of traumatic and orthopedic conditions and the restoration of many body functions. Hand massage administered by a skilled technician or the physician himself offers a variety of effects on the body structures and requires for its administration only a pair of skilled hands directed by a trained head. In traumatic conditions it serves in the early stages to relieve pain and spasm; later after preliminary heating it promotes absorption of swelling and helps to prevent formation of adhesions. Its general tonic effects may be called upon in many run-down and nervous conditions. *Corrective gymnastics* form the largest part of mechanical measures. They consist of either active or passive exercises. *Active exercise* is the most important physical therapeutic agent next to thermal measures, in the management of traumatic conditions as well as for general body conditioning and in all postural and orthopedic conditions. No apparatus as a rule is necessary for active exercises in the conditions described. *Passive exercises* may be performed by a technician or by certain mechanical devices in treatment of stiff joints or contractures as they occur after more serious injuries. In college health work passive exercise performed by the physician or an intelligent technician is usually all that is ever needed.

3. *Who is to direct the selection and application of physical therapy in college health service?* Modern physical therapy even in its simplified forms requires proper grounding and experience for both prescription and application. The task of determining whether physical therapy is indicated at all and if so what measures are to be employed, must be therefore left to a physician who has the required grounding in the subject. Properly trained technicians are indispensable for administering physical therapy in institutions, but it is not fair to expect technical aids or nurses, trained to employ physical measures only according to instruction, to be responsible for the ordering of treatments and the judging of their efficiency. This will be the case if the physical therapy department is in charge of a technician or of a physician who has had neither special instruction or training in the subject. No fountain rises above its head and for the best interests of physical therapy in college health service a combination of specially qualified physicians and skilfully trained technicians is most desirable.

Fractures of the Malar-Zygomatic Compound

Samuel G. Balkin, M.D., D.D.S.

Minneapolis, Minnesota

THE malar bone and zygomatic arch are so exposed to injuries that fractures are common. Frequently, the ensuing swelling and ecchymosis masks the presence of a fracture and the depression of the body of the malar bone or displacement of the orbital margins.

In modern warfare, the civilian population as well as the armed forces is subjected to aerial bombardment. People caught in or near falling structures are dealt crushing blows on the face by heavy, blunt objects, which result in this type of fracture. The mechanization of the fighting forces and the accidents occurring with these vehicles has further increased the number of injuries in addition to those caused by missiles as was so commonly seen in the last war. The recognition and proper treatment of this fracture is very often overlooked in the rush of caring for the immediate emergencies and the result of this neglect is not only a cosmetic deformity but also a disturbance in the function of the neighboring structures.

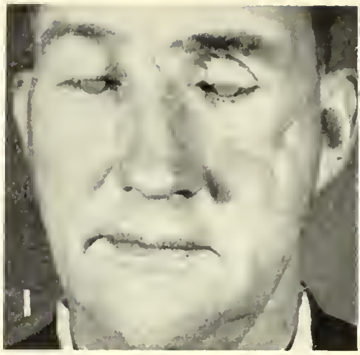
Automobile accidents, fist blows, sports accidents in football, hockey and baseball, where there may be collision between one player's cheek bone and another player's head or knee, contribute to the apparent increase in the incidence of such fractures. Any flying object such as a baseball, puck, bat, club or stick may strike with sufficient force to produce a fracture of the malar zygomatic compound. More rarely, a crushing pressure type of injury may occur as for example when a partially slipping jack permits a car to pin a mechanic's head against the floor. Figure 4 shows the roentgenogram of a fracture sustained in this manner. An individual may fall against any hard object. A recent case[8] was of this type. A man fell backwards into a ditch striking a rod which fractured his external orbital margin and wall, and caused displacement of the malar bone with complete extrusion of the eyeball downwards upon his cheek.

It is generally recognized that an actual fracture of the malar bone is extremely rare, rather, the entire bone is subluxated, the supports giving way when a direct force is applied to that bone. However, by common usage the term "fracture of the malar bone" is used to indicate the displacement of that part. The malar bone is united by a suture line medially with the frontal process of the maxilla, laterally and posteriorly with the zygomatic processes of the temporal bone, along its superior extension (fronto-sphenoidal process) with the frontal bone and inferiorly with the body of the maxilla. The malar bone forms a considerable portion of the floor and lateral wall of the orbit, and with the supraorbital rim and the bony bridge of the nose forms a protective bony ring for the eyeball. It forms the roof of the antrum and also serves for the origin of the anterior fibers of the masseter, the zygomaticus, and a portion of the quadratus labii superioris muscles. It is usually at the lines of articulation that the fracturing occurs since these supports are relatively weak; the body of the malar bone being strong will usually withstand the fracturing blow.

Since there are no strong muscle attachments to this bone, the displacement is entirely due to and in line with the direction of the blow. The displacement may be downward, upward, medially, backward and occasionally outward or forward since the position of the malar bone exposes it to a blow from almost any direction. Some degree of rotation may be present. The more common types of displacement encountered are in the downward, inward, and posterior direction, the malar bone being telescoped into the maxillary sinus. Another type of displacement is directly posterior and often with some horizontal rotation. The least common but most generally overlooked type of displacement is in an upward as well as posterior direction. These fractures are commonly associated with fractures of other facial bones and soft tissue injury, but discussion will be limited to injuries of the malar bone.

The diagnosis of such a fracture is relatively simple. The estimate of the degree and direction of displacement should be based mainly upon clinical judgment rather than upon X-ray interpretation. The early symptoms before swelling has occurred, an hour or two after injury, are a characteristic flattening of the cheek, a beginning discoloration of the eyelids and some bleeding from the nose. Later, the flattening is obscured by the swelling and ecchymosis of the lids is always present. Usually there is anesthesia of the upper lip and ala of the nose on the injured side. Inability to open the mouth to any appreciable extent may be present, due to a posteriorly displaced malar bone impinging upon the coronoid process of the mandible. In addition there may be visual disturbances such as blurring or diplopia due to eyeball displacement. Late signs of the fracture, after the edema has subsided, two or three weeks after injury, are in addition to the flattening of the cheek becoming apparent, an enophthalmos due to an increase in the size of the orbital cavity (fig. 1) or an exophthalmos due to a decrease in the size of the orbital cavity, as a result of the malar bone displacement. Palpation of the entire infraorbital rim particularly over the infraorbital foramen, along the lateral rim of the orbit and over the zygomatic arch will often determine the degree and direction of the displacement of this bone.

A very useful test which we have been using to determine the degree of vertical displacement of the malar bone is the eye muscle balance test. Since the upper surface of this bone forms the floor upon which the eyeball rests, any displacement in a vertical direction from its



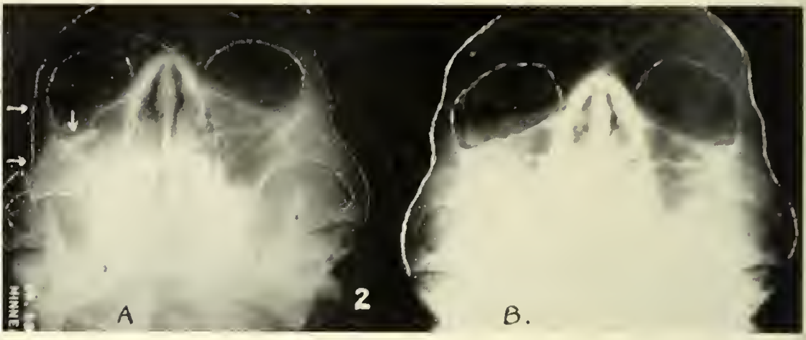
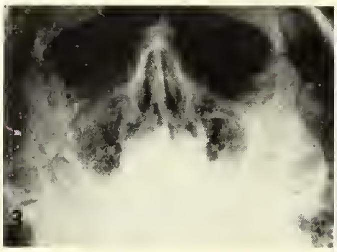


Fig. 1. Unreduced fracture of the malar bone with resulting enophthalmos, (lowering) downward displacement of the eyeball and diplopia with marked depression of the cheek.

Fig. 2. A—Roentgenogram showing fracture of malar bone with marked downward displacement of the external portion of the orbital rim and internal and downward displacement of the body of the malar bone. B—Roentgenogram showing successful reduction using the malar tenaculum forcep.



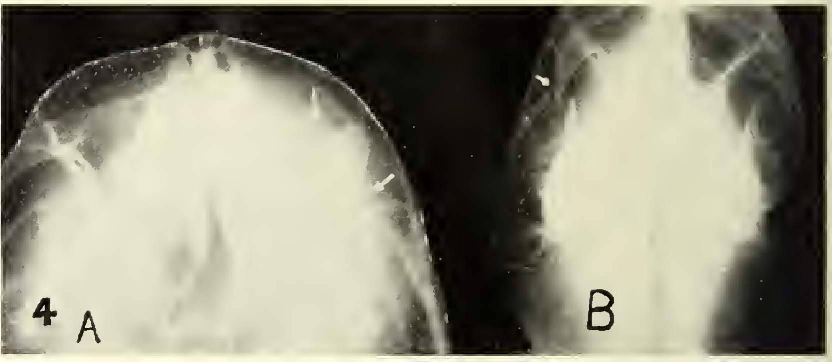
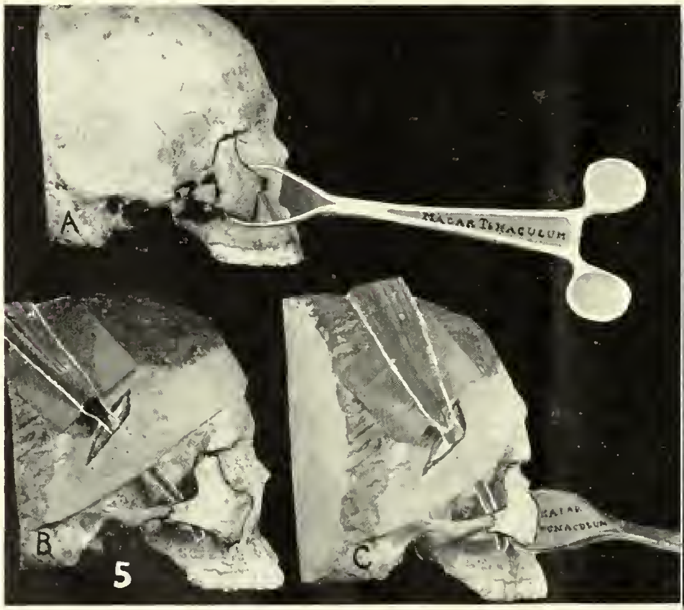


Fig. 3. Roentgenogram showing inward displacement of the body of the malar bone with upward displacement of a portion of infraorbital margin. Routine posteroantero (P.A.) Waters - Waldron sinus projection.

Fig. 4. A—Vertex submental projection (as for sphenoidal sinus). B—Modification. Each side taken separately by means of lead plates over the film. The central ray is directed $1\frac{1}{2}''$ on either side of the mid-sagittal plane.



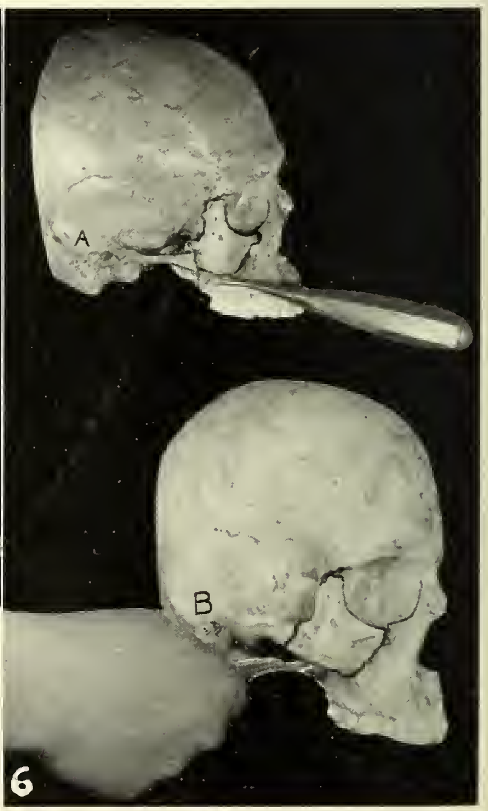


Fig. 5. A—Tenaculum aided by manipulation with the fingers used to grasp and reposition the malar bone. This is the method we have found most useful. B—Elevation of the decompressed malar bone and zygomatic arch through a temporal incision. Gillies, Killner, Stone. We have found this method very efficient when treatment has been delayed for ten days or more. C—Combined use of the temporal approach and tenaculum methods may be indicated to secure a more accurate reduction of the fracture.

Fig. 6. A—Intraoral approach to the base of the malar bone with a hook or elevator passed external to the maxilla. B—A frequently employed method of approaching and elevating the malar bone through an incision in the cheek.

normal position will alter the eyeball level. Since a vertical phoria is seldom encountered in the average person it is assumed that a vertical imbalance in an individual who has suffered a fracture of the malar bone is due to a vertical displacement of that bone. It is rather surprising to find that edema of the orbital contents per se, plays very little part in eyeball displacement. The eye muscle balance test is also an excellent postoperative check on the accuracy of the reduction obtained. During the past three years, we have been doing eye muscle balance tests on patients with fractures of the malar bone as soon as they are seen, immediately after reduction, and six weeks later. As a rule, with the malar bone in fairly good position and a two to three diopter hyperphoria present, no attempt at reduction is made. Any greater degree of displacement than this is corrected. In the cases followed, edema of the orbital contents played almost no part in changing the eyeball level. It is, therefore, a mistake to assume that a diplopia, which may be present, will become corrected when the edema subsides. It is true that the extrinsic muscles of the eye do, in time, make some adjustment of their imbalance as a result of the displaced eyeball. However, these patients will require the wearing of prisms and often in spite of this correction will have blurring vision or even diplopia when looking downward and to the side.

X-ray examination of the facial bones and especially of the malar bone is frequently quite unsatisfactory due to the superimposition of other bony structures. The usual projection for visualizing the nasal sinuses, the modified Waters-Waldron position (figs. 2 and 3) may project the rays parallel to the usual line of displacement of the malar bone. Thus, unless the infraorbital margin is displaced the X-ray interpretation might be "fracture of the malar bone without displacement." Surgeons so disposed as to depend entirely upon X-ray diagnosis rather than upon clinical examination will be misled as to the necessity of correcting the deformity. There are special X-ray views to visualize, from above, the body of the malar bone and zygomatic arch. These are often of value in determining the degree of rotation of this bone and the displacement of the arch. The vertex-submental position, when the exposure is made separately of each side, is probably the most valuable (fig. 4).

Treatment of this fracture should be undertaken as soon as the patient's general condition will permit. There is no point in waiting for a moderate amount of swelling to subside as has been recommended,[1] nor should drainage of blood from the antrum be instituted. Every fracture of the malar bone is compounded into the maxillary sinus and almost invariably that cavity becomes filled with blood. If left alone, it will clear itself of the blood in about three weeks; however, if interfered with, sinus infection often ensues.

The writer has seen just one instance of an acute empyema of the antrum following a malar fracture. In this case the patient gave a history of having a subacute maxillary sinusitis at the time of his accident. Therefore, any procedure used to reduce the malar fracture should avoid entering the maxillary sinus through the nose or mouth. The method found most applicable to the greater majority of these fractures is Waldron's modification of Gill's[2] method of using the tenaculum. With this tenaculum the displaced malar bones of not more than (fig. 5A) two weeks' duration can be readily elevated or pulled out into position. In fractures older than two weeks, or in cases in which an inward rotation of the zygomatic process has taken place, the use of the tenaculum, combined with the Gillies[3] temporal approach (figs. 5B and C) will result in a satisfactory reduction. Often either one or both of these procedures may be augmented by intraoral leverage applied at the base of the malar bone with the finger or a flat elevator (fig. 6A). Approaching through a cheek incision and using a hook to elevate the malar bone, as employed by many surgeons[5] is quite inefficient in breaking up strong impactions. In the same category, may be placed the use of Roberts'[6] screw porte. The degree of reduction obtained can be determined by palpation of the infraorbital rim externally and, within the mouth, determining the distance between the lower margin and posterior surface of the malar bone and the coronoid process of the mandible as compared with the normal, uninjured side.

In spite of the comminution of the surrounding bone, the malar bone will usually retain its position when reduced; however, where there is a considerable loss of supporting bone, it may be necessary to either fix the malar bone to its neighboring structures or hold it in the position desired. Direct fixation with a wire across the fracture line in the frontal process will usually hold the malar bone up in good position. A screw, as employed by Akerman, placed into the malar prominence (fig. 7A) and supported to a head cap by means of a wire may also be employed. However, any procedure which tends to open into the antrum such as passing wires entirely around the malar bone, or packing the antrum with gauze, should be avoided if at all possible. Fractures involving only the zygomatic process may be reduced and immobilized by Matas' method[4] (figs. 7B, 8A and 8B).

In old unreduced fractures of the malar bone, no attempt at re-fracturing should be made since there is great possibility of injury to the orbit. Building up the normal contour with cartilage and elevation of the eyeball, if necessary, by means of either cartilage or fascia lata, can be done with considerably less risk to the patient.

Malar fractures may be associated with fractures of the maxilla[7] and be displaced with one half or the entire upper jaw as a unit. The correction of displacement and the immobilization of the upper jaw with teeth in normal occlusion by means of a Universal head cap appliance[7] will hold the malar bone in its proper position. More frequently the malar bone is driven like a wedge into the maxilla which in turn becomes fractured and displaced. In these cases, the swelling of the face may mask the malar fracture and it will be found impossible

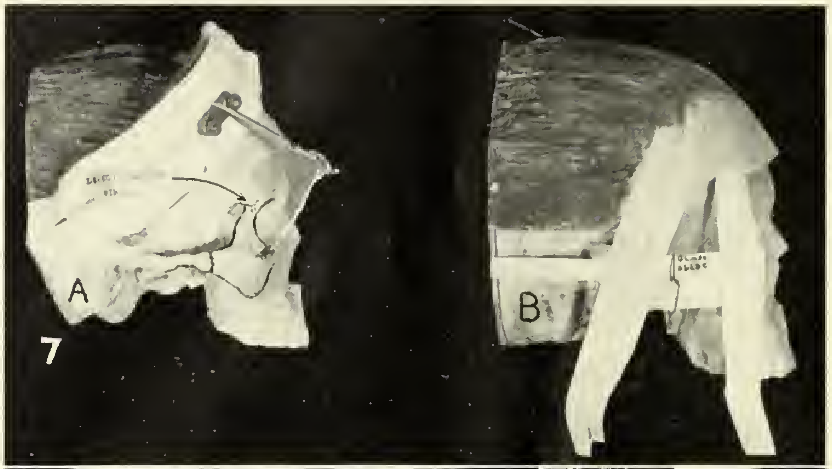


Fig. 7. A—In those cases where the malar bone will not remain up in position after reduction: (1) It may be held to the frontal bone with a silver wire. (2) Or supported from a headcap by means of a screw porte. B—Matas' method of elevating and maintaining a depressed portion of the zygomatic arch. It is pulled outward by means of a silver wire twisted over a micro slide which rests upon sponge rubber pads over the uninjured malar bone and the temporal bone at the base of the zygoma. The silver wire is passed around the depressed section of the zygoma by means of a large circular needle carrying a doubled heavy silk suture which is used to pull the wire through the tissues.

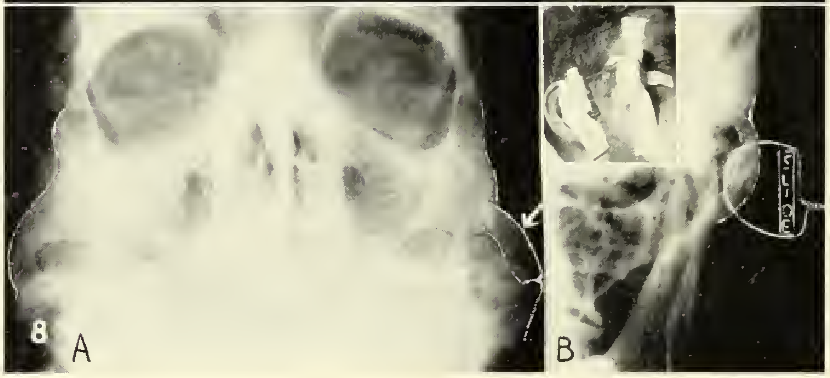


Fig. 8. A—Postero-antero roentgenogram showing a depressed fracture of the zygomatic arch without fracture of the malar bone. B—Roentgenogram showing wire passed beneath the arch. (Inset) Photo of patient.

to correct the displacement and mal-occlusion of the upper teeth until the malar bone is pulled out of its impacted position.

REFERENCES

1. Foman, Samuel: The Surgery of Injury and Plastic Repair, Baltimore, The Williams and Wilkins Co., 1939.

2. Gill, William D.: Fractures About the Orbit, South. M. J. 21:527, 1928.

3. Gillies, H. D., Kilner, T. P., Stone, D.: Fractures of the Malar-zygomatic Compound, Brit. J. Surg. 14:651, 1927.

4. Matas, R.: Fracture of the Zygomatic Arch, New Orleans M. & S. J. 49:139, 1896.

5. New, G. B.: Fractures of the Nasal and Malar Bone, Surg. Clin. North America 15:1241, 1935.

6. Roberts, S. E.: Fractures of the Zygomatic Arch, Ann. Otol., Rhin. & Laryng. 37:826, 1928.

7. Waldron, C. W., and Balkin, S. G.: Fractures of the Maxilla, Surgery 2:183, 1942.

8. Phelps, Kenneth E.: Personal communication. Minneapolis, Minn.

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MINNEAPOLIS, MINN., JULY, 1942

OUR GREATEST NATIONAL WASTE

The present need for competent, healthy, physically fit young men is more urgent than at any time in our nation's history. The current finding that nearly one-half of the men thus far examined for military service have been rejected because of various defects is viewed with a seriousness approaching alarm. The possible shortage of many materials with which we are faced is actually of less import than the shortage of man power with which we are threatened. It is more than probable that our scientists and industrialists, under the pressure of necessity, will invent and produce satisfactory substitutes for materials of which shortages may occur, but there can be no substitute for man power, either in the armed forces or in the production lines which support them. Theodore Roosevelt, in discussing our national resources, once declared: "Our national vitality is physically our greatest asset." Brigadier General Hershey, Deputy Director of Selective Service, has recently declared: ". . . we are physically in a condition of which we nationally should be thoroughly ashamed. It is a condition we should recognize as dangerous and which we should take immediate positive and vigorous measures to correct."

It has been estimated that approximately one-half of those now rejected can by corrective procedures be rehabilitated for full military service (1A) and the remaining one-half benefited to the extent that they may render useful service in the supply lines (1B). Relative to these Hershey comments further: ". . . this group must be utilized in a manner which will not permit them to escape military obligations because of their physical conditions." Relative to the same group Surgeon General Parran has declared: ". . . if it is stupid to waste money and material it is treasonable to waste man power."

Is it not tragic that we become conscious of such vast waste of our most valuable national asset only in times of extremity? Is it reasonable to presume that this group has become defective through their own volition? Ciocco, Klein and Palmer, in analyzing a small group (411) of selectees from Hagerstown, Maryland, 225 (54.7 per cent) of whom were rejected, have shown that the causes for rejection for the majority had been discovered and recorded during school life. In the records of the public schools throughout the nation we have and have had for years a basis for predicting long in advance the physical status of the adult group so essential in our present emergency. It is distressing that in spite of this knowledge medical and lay groups and society as a whole have had so little interest in the physical defectiveness of millions of our young men until we have special need of them. We are engaged in a desperate defense of democracy. The basic principle of democracy declares equal opportunities for all and special privileges to none. Have we afforded equal opportunity for all to attain the best possible physical status? Does it not follow that those physically unfit for military service are handicapped to some extent at least for civil pursuits also?

It is currently proposed by many that facilities be set up for the rehabilitation of the physically defective young adults to make them available for military service and that correction be made compulsory if necessary. Relative to this Hershey comments: "... there are agencies in the government at the present time which might be modified to serve as rehabilitation agencies—their part in the rehabilitation of the general public may or may not be feasible but for this group liable for military service *voluntary methods will not suffice.* Many a young adult male may rationally question the justice of a forced correction of his disqualifying physical defects in order that he may defend a social order which has done so little to prevent those defects.

It is to be hoped that in the establishment of rehabilitation of young adult males for military service we shall not be so shortsighted and undemocratic as to stop there. Instead we must make such services available in the earlier periods of life, under compulsion if need be, if we wish to attain the highest possible ratio of the physically fit. In so doing we shall not only prevent a recurrence of the embarrassing man power shortage of the present time, but at the same time correctly apply the principles of conservation to our most valuable national asset in time of peace as well as in war.

R. V. E.

JULY

This is the month of firecrackers, conventions, and vacations. As to the first of these it will be found that we are wasting no gunpowder at home, but that our armed forces are using it today in the most telling manner possible—on the fields of battle.

The annual conventions of the American Medical Association, North and South Dakota State Associations have already passed into history as among the best ever held. The Minnesota State Medical Association closed its eighty-ninth annual session at Duluth, July 1st. The annual meeting of the Medical Association of Montana held in Missoula, July 8th, 9th, and 10th, had an excellent program of subjects and speakers.

Vacations each must take according to his own taste. but we predict that they will be enjoyed nearer home, thus affording greater rest. We have laughed about the city mail carrier going on a hiking trip for his vacation, but the physician has usually changed his routine no more than that. In his daily grind he rides all day—he leaves home every morning in a car, returns at night in the same way, and during the day he has found it necessary to go from place to place, no matter how short the distance, by the same rapid means of transportation in order to conserve time and care for the expected and unexpected urgencies of his vocation with promptitude.

Many physicians, who have covered so much territory at 65 miles per hour in the past, only to come home vacation tired and in need of a rest will doubtless find themselves better off this year after the unexciting pastime of strolling about the country in accordance with apostolic custom of former days.

A. E. H.

THE DOCTOR'S RESPONSIBILITY IN WARTIME

Let no one doubt the present task which doctors face in Minnesota. Our home defense measures here must lie chiefly in keeping our farm "factories" going full blast. While blackouts may protect the northern mines, we in Minnesota must not allow another kind of blackout—a blackout of malnutrition, maladjustment, and disease—to fall upon our villages and small towns which are being weakened alarmingly in the present crisis. Today the war needs are stripping our farms to a degree where only old men, women, and machines are expected to carry on, and even some of these machines cannot be replaced.

We are rapidly becoming a country of old folks. The old must work now—work as long as they can and as they have never worked before. It is up to our state medical organization to keep them going, not just our three largest county societies but every county society in Minnesota. First of all, we must teach these old people how to eat; for many of them despite their long years of experience have wretched food habits. We must make them strong again.

We have far too many insane. Lonely people never intended for the new isolation of many of our country districts must now be guided to a happier, more productive adjustment whereby they can be made to carry on their full share of the war burden.

Prospective mothers, babies, and children must be cared for, fed, and taught the values of whole grain and natural foods in sufficient amount.

Teeth must be conserved. Of the first two million registrants for selective service, 20.9 per cent were found unqualified because of defective teeth.

We must remember that epidemic disease is always lurking in wartime. We must watch out for that always.

The responsibility lies largely with those of us who are living and serving in our glorious farming districts. We must see that in our state's war effort are coördinated work, security, sustenance, and health with a "light-up" rather than a "black-out" where it is needed.

E. L. T.

TRANSACTIONS OF
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Founded January 17, 1920

Senior Meeting Held at the Minneapolis Club Thursday, January 15, 1942
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CHANGES IN MILITARY RADIOLOGY SINCE THE FIRST WORLD WAR

R. G. ALLISON, M.D.

I think it may be of interest to the members of this society at this time to review briefly the status of radiology in 1917 as compared with its present status as regards its war duties and responsibilities.

The roster of The American Roentgen Ray Society in 1917 showed only 136 members as compared with a membership of over 500 in 1940.

In 1917, Dr. Lewis Gregory Cole of New York City as World War president of this society first was called upon by the Surgeon General of the Army to organize the X-ray Corps of the U. S. Army.

It was immediately evident that several hundred young physicians with little or no knowledge of the subject would have to be taught the rudiments of radiology. But most important, they must at the same time be taught to localize accurately and rapidly foreign bodies in the tissues. These problems were made all the more difficult owing to the fact that most of our most capable and active radiologists were attached to the already existing base hospitals and were either en route to Europe or had their sailing orders.

However, four schools of military radiology were started in widely scattered parts of the country. From these schools, after three or four months of instruction, these embryo radiologists were sent to the main school located at Cornell University Medical School at New York City. Here they were given an intensive two months' instruction in the localization of foreign bodies.

From here these men were sent abroad to complement the base, evacuation, and field hospitals which were being assembled abroad. Many of the men were of course detailed to permanent hospitals at the various army camps in this country.

Not only were we crammed with more facts than we could absorb, but in addition we had to learn to repair our machines as well. Later we found this instruction invaluable when we had to install and often build apparatus with no aid other than the hospital carpenters and electricians.

Many of us who had found this type of instruction very boring were doubly grateful for it when we adapted the standard 60 cycle American X-ray machines to the non-standardized frequencies of France, which varied from 32 to 90 cycles.

The small X-ray machines used only for fluoroscopy in the field hospitals were energized by a particularly balky and bulky type of gasoline engine. On all frosty mornings this engine had to be primed with ether to get it under way. This method in the hands of over-zealous or impatient technicians resulted in many Colles fractures and occasionally in an explosion which wrecked the engine entirely.

FOREIGN BODIES

When we were taught numerous methods of localizing foreign bodies, we found only one or two methods of real value.

The most valuable single instrument was a pair of bandage scissors. With this one could take off first-aid bandages and locate the foreign body by manipulation of the soft tissues under the fluoroscopic screen without a change in pace or hand.

Because of lack of time and material no X-ray plates were made unless there was fluoroscopic evidence of fracture. It is remarkable how adept the men became in recognizing not only the fractures but gas gangrene as well by the fluoroscope alone.

In this second World War radiology should be more easily and simply done than in the previous war. Certainly the apparatus will be far superior and thoroughly standardized.

It is to be hoped that the most experienced radiologists will be placed at debarkation points so that hundreds of men will not be sent back to America with unresolved pneumonia labeled tuberculosis.

This would not have happened in the last war if the X-ray men had been better located according to their special talents.

Dealing this time with men of proven ability and experience, there should be no confusion in placing the most capable men where they are most needed.

The consulting examiners in civil practices both here, in Canada, and in England, have done a wonderful job in eliminating pulmonary tuberculosis and peptic ulcer from the Army. These two diseases were probably the greatest causes of incapacity abroad in the last war.

We are all gratified and I think surprised to find so little tuberculosis among the draftees. Certainly it has not averaged above 1 per cent in the men examined.

I might add that in 1917 immediately after the outbreak of war, Dr. Lawrason Brown of Saranac Lake, New York, and Dr. Lewis Gregory Cole of New York City obtained sufficient funds to ray the chests of 2000 National Guardsmen just before they sailed for France.

This survey revealed 10 per cent of adult parenchymal tuberculosis. Armed with these facts these two gentlemen interviewed the Surgeon General and advised a single chest plate be made of every man in the army. This recommendation was turned down for several reasons, all of which in the light of our present general knowledge, seems absurd.

However, in this World War No. 2 the army is arranging for an admission and discharge film of the chest on each recruit. I regret that Dr. Brown did not live to see his recommendations adopted. I know that this decision on the part of the Army gives Dr. Cole deep satisfaction.

OBSTETRICS AND GYNECOLOGY IN 1941

RAE T. LAVAKE, M.D.

Two most illuminating and suggestive articles in obstetric literature for 1941 appeared in the March issue of the *American Journal of Obstetrics and Gynecology*—one by Dr. R. Gordon Douglas, of New York City, entitled "A Study of Puerperal Mortality in New York City (1935-40) With Especial Reference to Preventive Factors," and the other by Dr. Charles Gordon, of Brooklyn, entitled, "Puerperal Mortality in the Borough of Brooklyn, City of New York."

The findings in these reports show what improvement in maternal mortality can be brought about by the concerted action of the medical profession in studying every puerperal death intensively and by giving the results wide publicity among the profession, as has been done in the past ten years in the Maternal Mortality Studies of New York City, Philadelphia and the Fifteen States, and many other like researches.

Douglas reports that in New York City for the years 1931-35, the average puerperal mortality rate was 54.4 per 10,000 live births; in 1939 it had dropped to 29.6—a 45.6 per cent decrease.

The mortality decrease in the following conditions was:

Abortions	56.2%
Hemorrhage	33.3%
Septicemia	17.1%
Toxemias	56.4%
Accidents of childbirth including cesarean section	46.8%
All other conditions	59.0%

His suggestions for continued improvement coincide with those that are daily emphasized in our own hospital conferences:

1. The more general adoption of local anesthesia and greater restriction of general anesthesia.
2. The employment of blood plasma when whole blood is not immediately available and the exclusion of crystalloid solution, indicated for the immediate restoration of blood vol-

ume following hemorrhage to prevent the development of secondary shock.

3. Early recognition of the nature of infection and the proper use of the appropriate sulfonamide drug in adequate dosage when indicated.

4. Active participation by the general practitioner and specialist in maternal welfare meetings, believing this medium to be the best available and very satisfactory method of postgraduate instruction.

5. Assumption that every obstetric death involves mistakes in judgment or technic and a constructive attempt to profit from the experience.

Let us examine these figures. Why the reduction in abortion deaths of 56.2 per cent. It likely reflects a more widespread knowledge of the danger of abortion, reflects better treatment, and very likely reflects the more general knowledge and proper use of contraception. The reduction in the toll of abortion has been one of the primary aims of contraception. Again and again, in the past, women, after an abortion, would assert that if they became pregnant again they would repeat the abortion, and yet no measures were taken to prevent pregnancy. Again, the earlier and better treatment of pernicious vomiting with isolation, parenteral administration of glucose and saline, and the use of vitamin B has reduced the necessity for therapeutic abortion; and the better attention to eyeground findings, pulse acceleration, and mental condition has directed the earlier interruption of pregnancy, in rare cases, before it is too late to prevent a lethal outcome.

The mortality from toxemias decreased 56.4 per cent. It is quite clear from the literature and local observation that the long continued proper emphasis on prenatal care has brought about a more general and more early diagnosis of the toxemias, and improved treatment is being established at an earlier moment than in the past. Certainly, preëclamptic toxemia is being diagnosed earlier by closer attention to history and physical and more frequent and searching attention to edema, to too rapid increase of weight, urine, blood pressure and eyeground findings; and the essentials of treatment (salt free diet, limitation of fluids, bed rest, and hospitalization) are being more generally and earlier applied. Again, when parenteral solutions are deemed indicated, it is more generally realized that saline solution is definitely contraindicated. Increasingly in the past few years, and through the excellent articles of Chesley and Peckham in 1941, more and more attention has been given to the future of toxemic women as regards increased permanent vascular damage with curtailment of health and length of life. This consideration has weighed more heavily in deliberations as to when the pregnancy should be interrupted by medical induction, interference from below, or cesarean section, as circumstances and conditions guide the choice, before the accession of eclampsia, all these factors have made eclampsia a very rare entity. Again, it is becoming more generally realized that if interruption is deemed necessary, the prime factors, both in the interests of mother and child, are freedom from sedation and the use of local anesthesia, no matter what form of intervention is chosen.

Both Douglas and Gordon stress the too frequent death from cesarean section. The cesarean problem is still with us. Though Dr. George H. Ryder of New York City has presented figures this year which show that in a comparatively small parallel series of classical and low cervical cesareans the classical is the safer, the general New York studies agree with the majority of opinion which for many years has been, and still is, that the low cervical is the more safe. Douglas makes the suggestion that the classical operation should be limited to patients not in labor. Also, that after fifteen hours of labor, even the low cervical is accompanied by unwarranted risks to the mother.

Douglas, for individual interpretation, gives a most interesting chart showing the incidence, mortality, and percentage of all puerperal deaths correlated with the types of institution in which they occurred.

	City as a whole	Municipal Hospital	Voluntary Hospital	Proprietary Hospital
Incidence of cesarean section	2.4%	1.6%	3.1%	1.9%
Mortality of patients delivered by cesarean section	2.7%	5.1%	2.1%	3.3%
Pct. of all puerperal deaths associated with cesarean section	21.3%	12.6%	26.0%	34.2%

Especially is it interesting to note that even deducting the fetal mortality associated with premature separation and placenta previa, the fetal mortality in cesarean sections was 10 per cent.

It seems quite evident from these figures that we should all have adequate consultation before performing a cesarean section, and the fetal mortality would suggest a curious philosophy that would, in case of doubt, increase the chances of mortality for the mother from ten to twenty-five times in the interests of the child whose chances of death are from two to three times greater than the average general infant mortality.

The following possible errors in cesarean section management of fatal cases were tabulated by Douglas as follows:

Duration of labor too long before operation	12
Anesthesia (stress was laid on the advisability of local anesthesia)	11
Procrastination and delay in transfusion	9
Anemia—(antepartum) (Hb often unreported)	4
Error in technic	8
Inadequate preoperative care of cardiacs	2

Concerning the adequate care of pregnancy complicated by rheumatic heart disease, we have had an excellent study by Dr. Harry Gorenberg and Dr. John McGleary. This consists of a study and an analysis of 345 cases from the Margaret Hague Maternity Hospital, Jersey City, reported in the January number of the *American Journal of Obstetrics and Gynecology*. They counsel careful prenatal observations at frequent intervals and prompt institution of absolute bed rest at the first suspicion of any decrease of cardiac reserve, and most important, the hospitalization of any patient who presents a history of previous cardiac failure or a combination of prognostic signs indicating the possibility of difficulty. If the need for bed rest arises at any time in the pregnant state, the rest must be absolute and continuous for the duration of the gestation. There is a greater chance of women over thirty having decompensation than women under thirty. Seventy-five per cent of those having cardiac failure in the past had it during pregnancy. A basic conclusion is that patients who have had the benefit of treatment and go into labor well compensated may in general be handled on the basis of obstetrical indications essentially as though not suffering from heart disease. They feel that since the incidence of morbidity and the mortality rates are significantly higher following cesarean section and since cardiac decompensation is a rare accident during labor "the burden of proof" as they express it, lies with cesarean.

This year has increased the majority of those opinions which feel that premature separation of the placenta should be treated conservatively and not by cesarean section, except in those very rare instances where the condition of the baby and the mother seem to warrant an effort of quick delivery to save the baby, or where a Couvelaire uterus is suspected. In all cases the crux of the problem is adequate blood replacement.

The year 1941 has brought forth in the literature outstanding work which should lead to a decrease in infant mortality from cerebral hemorrhage and from prematurity.

The work of Huber and Shrader of Indianapolis, and others, on blood prothrombin levels would clearly indicate the wisdom of administering vitamin K to every woman in labor and to every infant during the early neonatal period. Drs. Beck, Taylor and Colburn showed in a series of 1022 infants where the mother was so treated during labor an incidence of only one-half of one per cent in manifestations of cerebral hemorrhage, as against an incidence of 2 per cent in a control group of 1037 where this treatment was not given—in this series, a reduction of 75 per cent. It seems most important, therefore, as already noted, that this treatment should be given without fail to mothers having a premature labor, a long labor, or an operative delivery, and to their infants in the early neonatal period.

In regard to the prevention of prematurity and the saving of prematures, Alfred C. Beck of Brooklyn has given us a remarkable study appearing in the August number of the *American Journal of Obstetrics and Gynecology*, entitled, "How Can the Obstetrician Aid in Reducing the Mortality of Premature Infants." He first shows that among 99,700 infants of known weight born alive in the city of New York in 1939, 7.3 per cent weighed under 2500 gms. Of those that weighed under 2500 gms., 18.4 per cent died in the first month of life, as againsr 1.2 per cent where the weight was above 2500 gms. Thus the hazard for the prematurely was fifteen times greater than for the maturely born infant. The following observations by Dr. Beck merit our continued attention:

"Many premature deliveries may be prevented and the interruption of pregnancy postponed by adequate prenatal care.

"If pregnancy is interrupted by cesarean section in toxemia, the operation should be done under local anesthesia and without preliminary administration of sedatives (the same admonition is applicable to interruption from below).

"In cardiac disease, congestive failure is especially dangerous to the premature infant. It, therefore, should be prevented by joint care of the mother by a competent cardiologist and obstetrician.

"Syphilis should be recognized by the use of routine Wassermann determinations and prematurity prevented by vigorous treatment of the mother throughout pregnancy.

"The dictum that there is no expectant treatment for placenta previa may have to be modified in the interests of the child. Careful observation in a good hospital and the use of large doses of progesterone to reduce uterine irritability might save some of the permature infants.

"When a second twin lies longitudinally, it should be permitted to deliver spontaneously if possible. Only after a delay of at least an hour is version and extraction of a premature infant justifiable.

"Before artificially interrupting pregnancy, the size of the child should be estimated by means of X-ray and consultation with another competent obstetrician always is indicated.

"Vitamin K should be given to the mother before interruption of pregnancy is attempted and throughout premature labors.

"The membranes should be preserved as long as possible and episiotomy should be done to protect the premature infant from the pressure effects of labor.

"Low forceps, preceded by episiotomy is a desirable method of delivery if the second stage tends to be prolonged.

"Immediate tying of the cord robs the infant of much needed blood. Blood in the umbilical cord should be stripped toward the fetus before the umbilical cord is tied.

"Cesarean section at times is a valuable method of delivery. It should be done under local anesthesia without preliminary sedation. The child should be delivered head first, and, if possible, the tying of the cord should be somewhat delayed in order that the fetus may obtain some of the blood which is in the placental circulation."

In the field of gynecology two of the most directional papers, of interest to gynecologists and general surgeons alike, are, first, an article by W. C. Weir of Cleveland, "Statistical Report of 1914 Cases of Hysterectomy," appearing in the August issue of the *American Journal of Obstetrics and Gynecology*, and, second, an article by Dr. W. C. Danforth of Evanston, "Total Hysterectomy, Abdominal and Vaginal," appearing in the October issue of the same periodical.

These studies lend added weight to the majority of opinion in favor of total hysterectomy where possible and feasible, as against supravaginal hysterectomy, especially if abnormality of the cervix exists. This is to obviate the chance of future cancer in the stumps and the complication of cervical discharge. In expert hands, the mortality rates of the two operations are about equal. It is the opinion, however, that operators of small experience in pelvic surgery should use the subtotal operation.

The accurate methods of roentgenographic pelvic mensuration and the determination of pelvic architecture of Dippel, Graber, Thoms and many others, we have seen more and more in everyday use. It is to be hoped that the day will come when everyone will use them when doubt exists as to the probability of safe delivery from below.

The year 1941 has seen a much wider use of the diagnostic aid furnished by soft tissue roentgenography in the diagnosis of placental position. Our roentgenologists are to be congratulated upon their beautiful exhibits in this field. Their work has been a tremendous help to us all. Every suspected placenta previa should have the benefit of such study as a guide to the best possible treatment in each individual case.

Endocrinology has been purposely omitted because this society has spent two evenings on the subject during 1941.

Time has necessitated a most selective presentation. It is to be hoped that the discussion will bring out any important omission.

INTERNAL MEDICINE IN 1941

Thomas A. Peppard, M.D.

The task of attempting to review advances achieved in medicine during the current year is somewhat analagous to attempting to evaluate contemporary history. Not only does the result differ, depending upon the individual interest, bias, and judgment, but also upon the vantage point of the individual reviewer. One may easily determine movement but not be sure that such movement actually represents progress or whether it merely stimulates progress.

In attempting to satisfy the requirements of the program committee I have interested myself in determining something about the home crop of scientific literary effort and mention some of these communications specifically, while taking cognizance of work published elsewhere. I have collected 101 titles and an equal number of authors from Minneapolis, these articles appearing in 31 various publications during 1941. Twenty-seven of these 101 authors are members of this organization. These publications include three volumes, one entitled *Healthful Living*, by Dr. Harold S. Diehl. Dr. Spink's book on *Sulfanilamide Therapy* is well known and has invariably received favorable reviews. Dr. Cecil Watson has edited and published in mimeographed, loose-leaf form, *Outlines of Internal Medicine*, to which there are seventeen contributors, five of whom are members of The Minneapolis Academy of Medicine.

Unabated interest in the study of virus diseases continues and there have been important advances in technical and laboratory procedures. Those of us who were in practice during the influenza epidemic of 1918 recognized at that time forms of pneumonia which were clinically different from what we had hitherto known but it has taken a long time to work out, explain, and partially clarify what we saw. It does seem that we are now nearer the answer than ever before. Here I want to mention two articles of Dr. John Adams and his description of epithelial cell inclusion bodies noted in the blood and sputum. Epidemiological work in encephalitis incriminated mosquitoes as vectors and wild fowl as reservoirs of this disease.

The suggestion that Vitamin B_6, when injected in large quantities was helpful in Parkinson's Disease, was pretty well disposed of by Dr. A. B. Baker.

During the pasr several years a goodly number of articles on the use of heparin have been published (many of these in the Scandinavian *Acta*). The use of this substance in blood vessel surgery, in subacute bacterial endocarditis and in attempting to prevent thrombosis and pulmonary embolism and infarction has been advocated. During 1941 I believe that there has been some lessened interest in, and perhaps lessened use of, heparin. Work was published a good many years ago showing the development of platelet thrombi in the fully heparinized animal.

Link and his associates of the Wisconsin Agricultural Experimental Station have isolated the causative hemorrhagic agent in spoiled sweet clover disease of cattle and have been able to produce the agent known as Decoumarin 3,3′ Methylenebis (4-hydroxycoumarin), which has been available for clinical studies and has been administered to dogs and to human subjects orally and, as a sodium salt, intravenously. Meyer, Bingham, Pohle (of Madison) and Barker, Butt, Allen (of Rochester) have reported on the results. This substance has been given up to six weeks time and no accidents as a result of bleeding have been noted.

Investigation is being conducted on some new bacteristatic and bactericidal substances, gramicidin and pencillin. The results of treatment of non-specific ulcerative colitis with sulfaguanidine have not been particularly successful. Further experience with sulfadiazine has been favorable.

McKinley and Ellis reported on a case of rather rare allergic pneumonia and McKinley and Cowan present a study of the pneumonias at the Student Health Service 1934-1940. There has been definitely increased incidence of atypical pneumonias with a corresponding decrease in the number of typical lobar pneumonias during the past two years. The observations of Dr. J. R. Paine on oxygen poisoning in dogs are undoubtedly significant and important.

Dr. Fahr and Dr. La Due have reported on their clinical investigation of the therapeutic value of lanatoside C. This preparation has proven effective on administration to patients with congestive heart failure, both with auricular fibrillation and with normal sinus rhythm. It is less toxic than preparations of digitalis purpurea. With the increasing number of case reports of operations for patent ductus arteriosus, the necessity for greater care is apparent in arriving at the diagnosis and in selection of cases to be subjected to surgery.

Medical men generally can well profit by the example of splendid reserve which the gastroscopists impose upon themselves particularly in regard to their conclusions concerning the correlation of symptoms and gastroscopic findings. Shindler's paper on gastritis is of interest and, locally, Dr. Carey and Dr. Ylvisaker have published the results of some of their findings. To all, I specifically recommend the group of papers published by the University Staff in the December number of *The New International Clinics*. In such a report the limits of time and space prevent mention of many important and worthy contributions.

ERNEST R. ANDERSON, M.D., Secretary.

Stated Meeting Held at the Minneapolis Club, Thursday, February 12, 1942

The paper presented by Dr. Karl W. Anderson at this meeting, "Blood Pressure as a Factor in Mortality," will be published in a later issue of THE JOURNAL-LANCET.

VITAMIN E IN PROGRESSIVE MUSCULAR DYSTROPHY. Failure of Oral Administration in 15 Cases

JOHN F. POHL, M.D.

Fifteen cases of progressive muscular dystrophy in children were treated with various vitamin E containing substances over a period of 22 months.

During the first 5½ months of the experiment the children were given daily 1 teaspoonful of wheat germ oil (vitamin E content equivalent to 5.5 mgs. of alpha tocapherol). No improvement in the condition of the patients was noted.

During the next 2½ months the children were given daily a vitamin E concentrate equivalent to about 30 teaspoons of wheat germ oil (vitamin E content equivalent to 156 mgs. of alpha tocapherol). With this increased dosage of vitamin E no objective improvement in the patients could be detected.

For the seven succeeding months the children were given daily 3 mgs. vitamin B, and 25 mgs. of vitamin B_6 in addition to the dosage of vitamin E concentrate described in the preceding paragraph. The addition of these two vitamins caused no improvement in the condition of the patients.

They were then each given daily 2 oz. of fresh dried wheat germ (vitamin E content equivalent to 8.5 mgs. of alpha tocapherol) for the remaining seven months of the experiment.

As a result of observations on 15 patients over a period of 22 months it is concluded that vitamin E when administered by mouth does not improve the condition of progressive muscular dystrophy. By objective examination, all of the cases became worse during the period of study.

DISCUSSION

DR. KARL ANDERSON: How many cases had achylia?

DR. J. F. POHL: We made no attempt to study the absorption of the vitamin. Possibly none of the vitamin E which we gave by mouth was absorbed and our failure could be explained on this basis. No one has reported on the blood level of vitamin E in progressive muscular dystrophy. No one knows whether there actually is a deficiency in the body in these cases. There is a recent report by Wechsler of New York that the vitamin E level is normal in untreated cases of amyotrophic lateral sclerosis, a disease of the nervous system reportedly helped by vitamin E.

DR. WILLARD WHITE: Vitamin E has been given in a variety of neuro-muscular disturbances. As has been noted there may be some question about the absorption of vitamin E from the intestinal tract. However, the synthetic vitamin E (tocapherol) has been given intramuscularly. I am quite certain that it has been definitely shown that the use of this substance has not been of any value in many of these conditions.

ERNEST R. ANDERSON, M.D., Secretary.

Stated Meeting Held at the Minneapolis Club, Thursday, March 12, 1942

OVARIAN PREGNANCY WITH ENDOMETRIOSIS IN THE SAME OVARY

Dr. Charles H. McKenzie gave a case report of an Ovarian Pregnancy and reviewed the literature since 1930. This report will be published elsewhere.

DISCUSSION

DR. J. C. LITZENBERG (by invitation): I cannot discuss this particular case very intelligently. In the twenty years that I have studied ectopic pregnancies in serial section I have never run across an ovarian pregnancy.

The most remarkable thing about this particular case is that it has been studied in serial sections and that it showed endometriosis. Sampson, who started our ideas about endometriosis, never found an ovarian implantation in endometriosis up to the time that I last had the opportunity of talking with him. It is very unusual to find an endometriosis in the ovary and a pregnancy there also. There has been a lot said that an ovum can only implant itself in endometrial tissue, which is entirely erroneous.

I have enjoyed this because it has been a great privilege, as I have not had the opportunity of studying an ovarian pregnancy myself although I had studied hundreds of tubal pregnancies in serial sections. I venture to say that of all the cases mentioned by Dr. McKenzie there were not 25 of them thoroughly studied in serial sections. Up to 1920 there had only been 16 cases described that filled all of Spiegelberg's postulates and since then I doubt if there were many more so studied. The most remarkable thing about this was the presence of an endometriosis in an ovary with an ovarian pregnancy—of course, we see endometriosis often in the ovary. Practically all of the blood colored cysts in the ovary are endometriosis but Dr. McKenzie found this very rare condition, a pregnancy and endometriosis.

Dr. H. M. N. Wynne: Dr. McKenzie mentioned several cases of full term ovarian pregnancies and other cases advanced beyond the fourth month. I doubt the possibility of being able to produce absolute proof of such advanced ovarian pregnancies. I had the opportunity of examining a specimen of a possible ovarian pregnancy of advanced development through the courtesy of Dr. J. J. Heimark. This specimen had been examined by Dr. J. S. McCartney who felt that the absolute proof could not be established.

I believe that Dr. LaVake described to me an early case which he had observed about 1920.

Dr. Rae T. LaVake: The ovarian pregnancy to which Dr. Wynne refers was most interesting. The ovary presented a crater about 1 cm. in diameter, in which lay a distinguishable embryo. We were much excited about it, and Dr. Litzenberg expressed a desire to have the specimen but when we went to get it for him it had disappeared.

URETEROCELE

E. L. Meland, M.D.

Ureterocele is a condition in which there is an intravesicle cystic dilatation of the intramural ureter. There are increasing numbers of cases reported in the literature. This condition is a result of two factors apparently: first, a stenosis of the ureteral orifice and second, a weakness of the longitudinal muscle of the lower ureter.

There are no symptoms of ureterocele per se. The symptoms are those of urinary tract infection and ureteral obstruction. In advanced cases there may be marked hydronephrosis and infection in an involved segment. There are cases in which stones are found in ureteroceles.

Treatment is dependent upon conditions found at examination. In the case of the small ureterocele, dilatation of the ureteral orifice or meatotomy may suffice. In larger cases transurethral resection of the ureterocele with a McCarthy resectoscope has proved to be a feasible procedure. Of course, in those cases where there is an advanced hydronephrosis and hydroureter with infection nephroureterectomy may prove necessary.

Eight cases which have been observed in the past few years were reported. In four of these, gross hematuria was a prominent symptom. In one case, right ureteral colic over a period of years was the condition for which the patient sought relief. In three patients stones were present in the ureterocele. Four patients either had no treatment or refused treatment. In one case meatotomy with a Collins knife was carried out and in three transurethral resection with a McCarthy resectoscope and evacuation of the calculus led to prompt relief of symptoms.

Discussion

Dr. C. D. Creevy: I have little if anything to add to this excellent presentation. Ureterocele is a relatively uncommon condition. It is comparatively simple to treat except in the presence of complications such as were found in the little boy who had the very large ureterocele with retention of urine, and the complete bilateral duplication. It is a very gratifying condition to discover because it is so easy to relieve. It is readily recognized by cystoscopy or radiography, but I do not believe it can be identified from its symptoms or physical findings except that occasionally in the female, a large ureterocele may prolapse into the urethra and present outside as a swollen, gangrenous mass. I have never seen a case of this type, but it has been reported.

I might say that the little boy with the ureterocele which filled the bladder is still living with bilateral nephrostomies which we are unable to close because of the extensive damage inflicted on the bladder before the ureterocele was recognized. Unfortunately, although the child had had symptoms since birth (he had difficulty in passing his urine and it had always been full of pus) and his parents had taken him to a number of physicians, none of them had thought anything of it until he reached the age of six, by which time the extensive damage which you saw in the slide had taken place.

Ernest R. Anderson, M.D., Secretary.

Book Reviews

Arthritis and Allied Conditions, Bernard I. Comroe, M.D., etc., of the University of Pennsylvania; 2nd edition, 878 pages, 242 engravings. Philadelphia: Lea & Febiger.

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This almost completely re-written volume retains the same cartographic classifications which made the original Comroe work on Arthritis and related subjects readily accessible to student, teacher and practitioner.

The boxed summaries and numerous clear illustrations enhance the value of the text, which is in turn concise and lucid.

The attitude expressed concerning etiology of various types and manifestations of arthritis is sane, notably so with respect of so-called foci of infection.

All therapeutic possibilities are thoroughly explored, including the most recent—sulfonamides. Full consideration is given to physiotherapeutic and orthopedic measures.

Methods of Treatment in Post-Encephalitic Parkinsonism, by Henry D. von Witzleben, M.D., Elgin State Hospital, Elgin, Ill.; New York: Grune and Stratton, 1942; 138 pages. $2.75.

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This small book is a brief review of the literature on the various treatments of post-encephalitic Parkinsonism. The author emphasizes primarily the treatment with Bulgarian root extract which he refers to under the trade name of "Bulgakur". In the discussion of the advantages of this type of treatment the author offers no comparative studies. His emphasis of physical exercises and calisthenics in the regime of these patients does warrant note. Generally, this book presents nothing new in the field of post-encephalitic Parkinsonism.

Psychiatry in Medical Education, Franklin G. Ebaugh, M.D., and Charles A. Rymer, M.D.; 619 pages. New York: The Commonwealth Fund: 1942.

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This book is primarily concerned with the status of psychiatry in medical education. The authors have gathered an enormous amount of information on this subject from all parts of the country and have attempted to present a clear picture of the advances made in this field. They also discuss in detail the present status of psychiatric education throughout the country with suggestions as to the most desirable teaching program in this field. For example, they conclude that an adequate course of psychiatric teaching in a medical curriculum should consist of about 150 hours including instruction in normal behavior during the first year, the dynamics of abnormal behavior during the second year, and finally a systematic presentation of the fundamentals of the major and minor psychoses consisting of clinical lectures, demonstration, clerkship, etc., during the third and fourth years.

Chapters are devoted to both preclinical and graduate psychiatric education. The premedical curriculum is considered in relation to psychiatry, emphasizing the importance of including as prerequisites the various social sciences and psychology in order to enable the medical student to adequately evaluate an individual as a whole. The chapter on graduate education is most instructive and considers the requirements of the American Board of Neurology and Psychiatry for certification, opportunities in the field of psychiatry, mode of selection of residencies, and finally information regarding the general training offered by the various institutions throughout the country.

This book contains a wealth of information and should be of particular value to those engaged primarily in psychiatric education to whom it offers an opportunity to evaluate their own teaching program in the light of what is being done elsewhere as well as from that which is recommended by the authors from their exhaustive investigation.

News Items

Dr. J. R. Delaney, Kalispell, Montana, who has been associated with Dr. F. B. Ross for the past two years, is now a senior lieutenant in the Medical Corps and has been assigned to the United States Naval hospital in Bremerton, Washington.

Dr. John H. Moore, Grand Forks, has been re-elected president of the North Dakota Public Health Advisory Council.

New officers of the Minneapolis Academy of Medicine are as follows: Dr. Roy E. Swanson, president; Dr. Elmer M. Rusten, vice-president; Dr. Cyrus O. Hansen, secretary; and Dr. Thomas J. Kinsella, treasurer.

Dr. Mario Fisher, Duluth city health officer, has been appointed medical director of St. Louis county. He will serve part-time, and will continue his duties as city health officer.

Dr. John Lewis, Tracy, Minnesota, has been commissioned a first lieutenant in the Medical Corps of the U. S. Army.

Dr. J. A. Myers, Minneapolis, was named president-elect of the American College of Chest Physicians at the annual meeting of the group held recently in Atlantic City, New Jersey.

Dr. I. L. Schuchardt, who has practiced in Aberdeen, South Dakota, the past five years, is now a first lieutenant in the Medical Corps of the United States Army.

Colonel Clyde W. Jump, formerly of Bozeman, Montana, has been promoted from lieutenant colonel to colonel in the United States Army Medical Corps. He is an executive officer of the post surgeon's office, Fort Mason, California.

Dr. H. Paul Hohnson, Harmony, Minnesota, has accepted a fellowship in ophthalmology at Columbia University.

Dr. A. B. Rosenfield, Hibbing, Minnesota, reserve officer in the United States Medical Corps for the past eighteen years, reported for active duty in Omaha June 12.

Dr. W. M. Haller, Bemidji, Minnesota, has been commissioned a captain in the United States Medical Corps.

Dr. Eleanore Iverson, Minneapolis, has joined the medical staff of the Fergus Falls State hospital.

Dr. R. M. Morgan, a member of the Murray hospital staff, Butte, Montana, has joined the United States Army Medical Corps and is stationed at Barnes General hospital, Vancouver, Washington.

Dr. LaMeta Dahl has assumed her duties as resident physician at the Children's hospital, Denver, Colorado. A graduate of the University of Minnesota Medical School, Dr. Dahl completed her internship in a Minot, North Dakota, hospital.

Dr. Richard W. Giere is the new chief of staff at Fairview hospital, Minneapolis.

Dr. Paul F. Dwan, head of the Human Serum Laboratory at the University of Minnesota, addressed the Northwest District Medical society in Minot, North Dakota, June 25.

Dr. E. R. Addy, Gilbert, Minnesota, is now a first lieutenant in the United States Army Medical Corps.

Dr. Glenn H. Leemhuis, formerly of McGregor, is now practicing in Aitkin, Minnesota.

The sum of $1,000 has been made available by the National Tuberculosis association for continuation of the tuberculosis control demonstration, which has been in progress in Meeker county, Minnesota, since May, 1941.

Dr. Emil Johnson, Minneapolis, for the past two years deputy coroner, has been commissioned a first lieutenant in the United States Army Medical Corps. He has reported at Camp Carson, near Colorado Springs, Colorado.

Dr. R. K. Dood, formerly of Wimbledon, North Dakota, is now in Lisbon, where he has taken over the practice of Dr. Stolinsky, who recently entered Army service.

Dr. Charles E. Magner, Great Falls, Montana, has enlisted in the Army Medical Corps of the United States Army as a first lieutenant.

Dr. F. E. Boyd, Flandreau, South Dakota, is now a captain in the United States Army Air Force.

Dr. C. B. Philip has completed a year of advanced study at Johns Hopkins university and Harvard medical school, and has returned to Hamilton, Montana, where he is medical entomologist for the Rocky Mountain laboratory of the National Institute of Health.

Dr. E. H. Lutz, a member of the staff of the Willmar (Minnesota) state hospital for the past five years, resigned his position, effective July 2, to join the staff of the Oregon state hospital in Salem.

Dr. C. B. Abbott, Springfield, Minnesota, has enlisted in the United States Army Medical Corps.

Dr. James Grassick, Grand Forks, North Dakota, celebrated his 92nd birthday anniversary June 29th. Dr. Grassick maintains offices in the city, never "exactly" having given up his practice.

Dr. Donald McCannel, Minot, North Dakota, has been commissioned a captain in the United States Army Medical Corps. He has been practicing in Memphis, Tennessee, for the past six months, having gone there from Rochester, Minnesota, where he had a fellowship at the Mayo Clinic.

Four staff members of the Mayo Clinic were awarded a bronze medal by the American Medical Association at the 93rd annual meeting in Atlantic City, New Jersey, for their studies of ovarian cancer. They are: Drs. L. M. Randall, M. C. Piper, L. A. Brunsting, and M. B. Dockerty.

A series of health conferences for infants and preschool age children, was sponsored in Williston, North Dakota, the week of June 22, by the PTA. Dr. Caroline Helmick, a physician of the division of child hygiene, state department of health, conducted the conference.

Captain Charles F. Honeycutt, United States Army Medical Corps, a former member of the staff of the Western Montana clinic, is now chief of the surgical service at the station hospital, Camp San Louis Obispo, California, where he has been assigned for the past year.

Dr. R. K. Minge, formerly of the Clarkfield Community hospital, Granite Falls, Minnesota, has accepted a fellowship at the Crile Clinic, Cleveland, Ohio.

The Minneapolis Board of Public Welfare recently approved the establishment of a Sister Kenny clinic for the treatment of poliomyelitis in the Lymanhurst Health Center.

Dr. James A. Mason, formerly of International Falls, Minnesota, has been promoted to the rank of major in the United States Army Medical Corps.

Dr. Thomas H. Dickson, St. Paul, medical director of the Minnesota Mutual Insurance Company, has been named chairman of the American Life medical section.

Dr. Schmitz, formerly associated with Dr. E. G. Nethercott in Pine City, has joined the staff of the Mesaba Clinic in Hibbing, Minnesota.

Dr. H. D. Harlowe, Virginia, Minnesota, has entered the Medical Corps of the Army Air Force with the rank of captain. For the past five years he was affiliated with the Lenent-Peterson Clinic as eye, ear, nose and throat specialist.

A new textbook on Red Cross Home Nursing, bearing the stamp of approval of authorities in the fields of nursing, medicine, and public health, is to come off the press in July, Miss Mary Beard, director of the American Red Cross Nursing Service, has announced. Two million copies have been ordered by the Red Cross for the use of homemakers, both old and young, masculine and feminine, in Red Cross home nursing classes throughout the country. The new textbook will replace one which, though revised upon occasion, was written originally in 1913 by Jane A. Delano and Isabel McIsaac. The new textbook has been entirely prepared and brought up to date by Miss Lona Trott, R.N., B.S., assistant director, health education, Red Cross Nursing Service. Bound in the familiar gray cover with red trimming, the publication is divided into four sections: "Health and Happiness in Home Life;" "How the Community Protects the Health of Home and Family;" "How to Take Care of Mother and Baby;" and "What to do When Sickness Invades the Home." The book is priced at 60 cents and is illustrated with about 100 pictures and drawings, many of them helpful in teaching home nursing procedures. It may be procured from any Red Cross chapter.

Dr. E. G. Strauss, assistant in the Biwabik (Minnesota) hospital, has joined the United States Navy and is stationed at the Navy hospital in Philadelphia.

Dr. Marjorie E. Reed of Plymouth, Pennsylvania, was appointed Director of Woman Physicians of the Medical and Surgical Relief Committee of America at a gathering for committee physicians who attended the annual meeting of the American Medical Association in Atlantic City. Dr. Reed has built up in Luzerne county, Pennsylvania, an active group of women physicians who have sent quantities of medical supplies and contributions amounting to approximately $1900 to committee headquarters in New York.

Dr. Hugh D. Patterson, who for the past year has been staff physician at Anoka State hospital, Anoka, Minnesota, is now in the United States Navy.

Dr. Ted Keller, Rugby, North Dakota, has entered the United States Army Medical Corps as a first lieutenant. Dr. Keller came to Rugby from Rolette in January, 1941. He previously had practiced at Leola, South Dakota.

Dr. P. E. Kane, Butte, is the newly elected president of the Montana State Board of Medical Examiners. He succeeds Dr. E. S. Porter of Lewistown. Dr. A. R. Foss of Missoula was named vice-president and Dr. Otto G. Klin of Helena was re-elected secretary. Members of the examining board in addition to the officers are Drs. A. T. Munro, Kalispell, J. H. Garberson, Miles City, and C. H. Nelson, Billings.

New officers of the Minnesota State Medical association are: Dr. Stephen H. Baxter, Minneapolis, president-elect; Dr. J. F. Norman, Crookston, first vice-president; Dr. F. W. Lynch, St. Paul, second vice-president; Dr. B. B. Souster, St. Paul, secretary; and Dr. W. H. Condit, Minneapolis, treasurer. The latter two were re-elected.

Michael Reese Hospital Cardiovascular Department announces a full-time intensive course in Electrocardiography for two weeks, August 17 - August 29, 1942. The course will be conducted by Dr. Louis N. Katz, Director of Cardiovascular Research, and is intended for the general practitioner. There will be practice on several electrocardiographic machines and discussion of the principles of their construction and use. There will be sessions on interpretations of electrocardiograms illustrated by lantern slides, and practice by the student with unknown records. Routine records taken during the time of the course will be discussed. Emphasis will be placed on chest leads and on the importance of the electrocardiogram in coronary sclerosis and myocardial infarction. The mechanism and interpretation of heart irregularities will be developed. As group and individual instruction will be given, the course is open to both the beginning and advanced student in Electrocardiography. It is planned to individualize the course so that at the end of the period each student will be capable of taking and properly interpreting routine electrocardiograms. In order to accomplish this purpose the class will be limited in number.

THEODIATAL CAPSULES K/B
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They may be considered logical conservative therapy as the synergistic action of ingredients enhances the possibility of unusually low maintenance doses.

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Samples and Literature on request.

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Advertiser's Announcements

ANTI-ROCKY MOUNTAIN SPOTTED FEVER SERUM ANNOUNCED BY LEDERLE

Rocky Mountain spotted fever, now reported as occurring in at least 37 states, can be successfully combatted by a preventive vaccine and a curative serum announced by Lederle Laboratories, Inc., 30 Rockefeller Plaza, New York City.

Highest incidence of the disease has been found in Wyoming, Montana, Oregon, and Idaho in the northwest and in Maryland, Virginia and North Carolina on the Atlantic seaboard.

Susceptibility to spotted fever is general in both man and the lower animals. The disease closely resembles endemic typhus fever. It begins with sudden chills and continuous, moderately high fever followed by gradual dropping of temperature; severe arthritic and muscular pains; and a profuse skin eruption, appearing first on the ankles, wrists and back, but rapidly spreading to all parts of the body. In the East, most cases occur in children during the summer months; in the West, adult cases are common in the spring.

Probably the majority of patients contract the disease from infected ticks from domestic animals, like horses, cattle, sheep and dogs. The western type of Rocky Mountain spotted fever is transmitted by the wood tick, *Dermacentor andersoni*, the eastern type by the dog tick, *D. variabilis*. Persons who are forced to travel into or who live in tick-infested areas, especially those who go out into the open fields in these regions, should be vaccinated at least ten days prior to expected exposure.

"Rocky Mountain Spotted Fever Vaccine *Lederle*" is prepared from chick embryo by the yolk sac method of Cox. During 1941 the chick vaccine was extensively used for the prevention of Rocky Mountain spotted fever in humans, with results equally as good as those described with the tick vaccine, previously used. The U. S. Public Health Service is now using the chick embryo vaccine in place of the tick vaccine at its branch laboratories in Hamilton, Montana.

Parker, reporting in the *Journal of the American Medical Association* for 1938 (Vol. 110, pages 1184 and 1273) after 15 years' use of Rocky Mountain spotted fever vaccine (tick type), stated that only 64 out of 15,000 vaccinated in an endemic area developed spotted fever.

Anti-Rocky Mountain spotted fever serum is intended for the treatment of acute cases of the disease. The serum should be given as soon as possible after the onset. "Anti-Rocky Mountain Spotted Fever Serum *Lederle*" is an immune serum obtained by injecting rabbits with the Cox yolk sac material and is refined and concentrated by the same procedures used to purify anti-pneumococcal rabbit serum.

"MAN" AND "WOMAN" FOLDER SERIES PLANNED BY SCHERING

A series of folders on "Man" and "Woman" which will provide an integrated and comprehensive survey of physical development with particular reference to the normal and abnormal endocrinological states, is being planned for early distribution by the Medical Research Division of the Schering Corporation.

The first of these folders, "Man I—Genitalia and Sex Characteristics," is concerned with normal features of male sexual development (with anatomical illustration), and discusses therapeutic effects of androgen therapy in cases of functional and organic genital disorders. This folder will be available shortly.

Future titles in the series Man include, "Male Sex Hormone and Body Growth"; "Constitutional Effects of Male Sex Hormone"; "Involutional Disorders"; and "Benign Prostatic Hypertrophy."

Titles in the series Woman which are to appear shortly, are "Genitalia and Sex Characteristics"; "The Menstrual Cycle"; "The Menopause and Postmenopausal Disorders"; "Functional Bleeding Disorders"; "Dysmenorrhea"; "Control of Lactation"; and "The Uterus and Pregnancy."

The Schering Corporation will make each folder in the series available to physicians and hospitals, at the time of issuance.

The
JOURNAL
LANCET

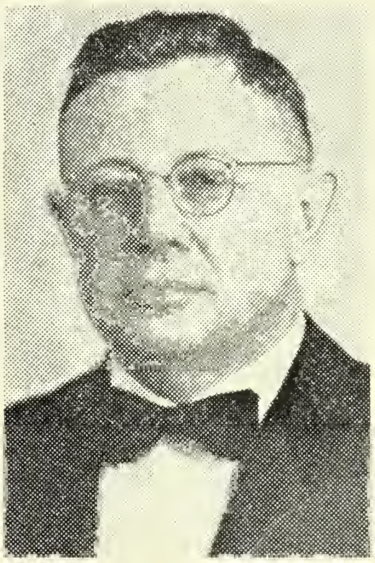
Minneapolis, Minnesota
August, 1942

Vol. LXI, No. 8
New Series

Transactions of the South Dakota State Medical Association

Sixty-First Annual Session
Sioux Falls, South Dakota
May 13, 14, 15, 1942

N. J. Nessa, M.D.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The Council	

MEDICAL DEFENSE

L. J. PANKOW, M.D. (1943)	Sioux Falls
W. H. SAXTON, M.D. (1944)	Huron
T. F. RIGGS, M.D. (1945)	Pierre

MEDICAL EDUCATION AND HOSPITALS

F. J. TOBIN, M.D. (1943)	Mitchell
T. P. RANNEY, M.D. (1944)	Aberdeen
FARIS PFISTER, M.D. (1945)	Webster

MEDICAL ECONOMICS

G. I. COTTAM, M.D. (1943)	Sioux Falls
HAROLD MILLER, M.D. (1944)	Brookings
C. E. ROBBINS, M.D. (1945)	Pierre

PUBLIC HEALTH

A. TRIOLO, M.D.	Pierre
Sub-Committee on Cancer	
T. J. BILLION, M.D. (1943)	Sioux Falls
JOHN L. CALENE, M.D. (1944)	Aberdeen
O. S. RANDALL, M.D. (1945)	Watertown
Sub-Committee on Tuberculosis	
E. W. JONES, M.D. (1943)	Mitchell
R. E. JERNSTROM, M.D. (1944)	Rapid City
Sub-Committee on Mental Hygiene and Child Welfare	
F. W. HAAS, M.D. (1943)	Yankton
MYRTLE S. CARNEY, M.D. (1944)	Pierre
GOLDIE ZIMMERMAN, M.D. (1945)	Sioux Falls
Sub-Committee on Syphilis Control Program, U. S. P. H. Service	
G. J. VAN HEUVELEN, M.D. (1943)	Pierre
FRED P. BESTGEN, M.D. (1944)	Rapid City
ANTON HYDEN, M.D. (1945)	Sioux Falls

NECROLOGY

J. V. McGREEVY, M.D. (1943)	Mitchell
R. V. OVERTON, M.D. (1944)	Winner
E. JOYCE, M.D. (1945)	Hurley

MEDICAL BENEVOLENT

J. C. SHIRLEY, M.D. (1943)	Huron
D. S. BAUGHMAN, M.D. (1944)	Madison
W. E. DONAHOE, M.D. (1945)	Sioux Falls

SPECIAL COMMITTEES

RADIO BROADCAST

W. E. DONAHOE, M.D.	Sioux Falls
S. M. HOHF, M.D.	Yankton
R. E. JERNSTROM, M.D.	Rapid City

EDITORIAL

J. C. SHIRLEY, M.D.	Huron
J. C. OHLMACHER, M.D.	Vermillion
R. E. JERNSTROM, M.D.	Rapid City
C. E. SHERWOOD, M.D.	Madison
GILBERT COTTAM, M.D.	Sioux Falls
J. F. D. COOK, M.D.	Pierre
J. F. ADAMS, M.D.	Aberdeen

MEDICAL LICENSURE

G. W. MILLS, M.D.	Wall
H. R. BROWN, M.D.	Watertown
WM. A. DELANEY, M.D.	Mitchell

ADVISORY WOMEN'S AUXILIARY

D. S. BAUGHMAN, M.D.	Madison
J. C. SHIRLEY, M.D.	Huron
C. E. SHERWOOD, M.D.	Madison

ALLIED GROUP

N. K. HOPKINS, M.D.	Arlington
E. M. STANSBURY, M.D.	Vermillion
E. A. PITTENGER, M.D.	Aberdeen

MILITARY AFFAIRS

WM. DUNCAN, M.D.	Webster
H. T. KENNEY, M.D.	Watertown
D. A. GREGORY, M.D.	Milbank

RADIOLOGY

J. R. FUCHLOW, M.D.	Rapid City
J. H. LLOYD, M.D.	Mitchell
O. A. KIMBALL, M.D.	Murdo

SPAFFORD MEMORIAL FUND FOR SCHOLARSHIP AT UNIVERSITY OF SOUTH DAKOTA

R. G. STEVENS, M.D.	Sioux Falls
C. E. SHERWOOD, M.D.	Madison
J. C. OHLMACHER, M.D.	Vermillion

Advisory to Departments of State Board of Health

OPHTHALMOLOGY AND OTOLARYNGOLOGY

JOHN B. GREGG, M.D.	Sioux Falls
WM. SAXTON, M.D.	Huron
H. D. NEWBY, M.D.	Rapid City

ORTHOPEDICS

G. E. VAN DEMARK, M.D.	Sioux Falls
F. W. MINTY, M.D.	Rapid City
W. A. DELANEY, M.D.	Mitchell

SOCIAL SECURITY

J. F. D. COOK, M.D.	Pierre
W. A. DAWLEY, M.D.	Rapid City
R. A. BUCHANAN, M.D.	Huron

MATERNAL AND CHILD WELFARE

R. E. JERNSTROM, M.D.	Rapid City
W. E. DONAHOE, M.D.	Sioux Falls
E. S. WATSON, M.D.	Brookings

COUNCIL MEETING—APRIL 2, 1942

The Council of the South Dakota State Medical Association convened at noon luncheon on Thursday, April 2, in the private dining room of the Marvin Hughitt Hotel in Huron. Roll Call: The following members of the Council were present: Drs. B. M. Hart, N. J. Nessa, J. C. Ohlmacher, C. E. Sherwood, J. L. Calene, H. R. Brown, D. S. Baughman, C. E. Robbins, G. E. Burman, J. H. Lloyd, E. S. Stansbury, R. V. Overton, Wm. Duncan, and O. J. Mabee. In addition, Dr. J. F. D. Cook, superintendent of the State Board of Health, and Karl Goldsmith, attorney, were present.

Minutes of previous meeting were read and approved. Secretary reported on the plans for the annual session to be held in Sioux Falls, and with the approval of the Councilors present, it was decided to have most of the business sessions on the first day, Wednesday, May 13, with meeting of the Council scheduled for 10 o'clock and House of Delegates at 2 o'clock and 8 o'clock on the same date.

The matter of coöperation of the South Dakota State Medical Association with the Writers' Project of the WPA in the publication of an almanac for South Dakota and distribution in South Dakota was discussed. Such coöperation is to consist of the association furnishing accurate descriptive data of certain diseases for inclusion therein. This matter was discussed at length by Dr. Cook and members of the Council and after full discussion it was moved by Dr. Lloyd and seconded by Dr. Ohlmacher, that we coöperate in the project providing the complete copy of the materials to be included in the almanac be edited by the State Board of Health. It was passed by a vote of 7 to 4.

Dr. Cook reported about difficulty the department of Vital Statistics has run into in connection with the WPA project of Graves Registration.

Mr. Falk and Mr. Bunt, of the State Department of Education, appeared before the Council and discussed the matter of a project that was being urged on them from Washington, of having high school seniors examined prior to graduation with the idea that remedial defects might be uncovered and remedied before these boys become of registration age and in that manner perhaps aid in the war effort. This matter was discussed at length by Drs. Cook, Burman, Calene and others. It was finally moved by Dr. Burman, seconded by Dr. Calene, that this matter be referred to the Public Health Committee of the South Dakota State Medical Association. Motion carried. Dr. Baughman, chairman of that committee, suggested that the matter probably should be an educational program put on by the State Department of Education, suggesting to each high school that it set up a program of encouragement of having these examinations as a patriotic duty and that a uniform blank be developed to be used with the data made available to the department and to the State Board of Health for statistical purposes.

Dr. Cook informed the Council that the Selective Service wishes to make available to the State Board of Health the record and films of those selectees rejected because of tuberculosis and he asked if the Council would approve the State Board of Health acting as a repository for this information. It was moved by Dr. Calene and seconded by Dr. Robbins that this be approved. Motion carried.

Dr. Burman brought before the Council the matter of WPA aided hospital for Lake Preston. The movers of this project asked for Council approval. After discussion, it was moved by Dr. Duncan and seconded by Dr. Mabee that Dr. Burman get more information on this project, particularly about control of hospital and present it at the next meeting of the Council before any action be taken.

Karl Goldsmith reported on a case settled in the court, determining the priority of government feed and seed loans over expense incurred during last illness. He pointed out that in order to get this changed, a special act of congress would be needed.

Dr. Duncan, state chairman of Procurement and Assignment Committee, discussed this matter and announced the appointment of state committees as: Drs. Nessa, Jernstrom, B. A. Bobb, J. F. D. Cook, and Sherwood. Other information relative to the Assignment and Procurement Committee was discussed by Drs. Cook and Calene, who had been present recently in Chicago, where director Major Seely, was present.

Dr. Cook suggested that an educational program be inaugurated as suggested by the speaker at the recent meeting of the state and territorial health officers in Washington urging people that physical examinations with care of remedial defects and immunization against various diseases be had by the people at once, as a conservation measure for future medical attention in view of the fact that there is an imminent scarcity of physicians due to the large numbers needed by the armed forces.

The matter of South American physicians being granted permission to practice in the state as assistants was discussed. It was pointed out that there are no hospitals in the state approved for residence or internship and that the present law requires a declaration of intention for citizenship as a prerequisite for licensure.

Dr. Hart gave a brief discussion of his work for the year and words of appreciation of the coöperation of the officers and the local societies. He stated that he had visited each of the societies and that on many of these occasions, Karl Goldsmith has been with him and presented a fine talk on some phase of medical malpractice.

Dr. Robbins of Pierre district reported on their medical service set-up and Dr. Mabee reported that the Mitchell district was contemplating taking on a similar venture. After discussion, by several members, it was moved by Dr. Stansbury and seconded by Dr. Calene that approval of the Council be given to the continuance of the project for another year but before any new contracts were entered into by any society, approval of the Council be secured. Motion carried.

There being no further business, meeting adjourned.

Clarence E. Sherwood, M.D., *Secretary.*

ANNUAL MEETING OF THE COUNCIL OF THE SOUTH DAKOTA STATE MEDICAL ASSOCIATION

First Meeting of the Council
May 13, 1942

In the absence of the chairman, the meeting was called to order at 10:30 A. M. by Secretary Sherwood, in the meeting room of the Carpenter Hotel in Sioux Falls. Roll call: The following members of the Council were present: Drs. B. M. Hart, N. J. Nessa, J. C. Ohlmacher, C. E. Sherwood, J. L. Calene, H. R. Brown, C. E. Robbins, J. H. Lloyd, W. E. Donahoe, E. M. Stansbury, R. V. Overton, C. E. Lowe, Wm. Duncan, O. J. Mabee, and D. S. Baughman. In addition, Karl Goldsmith, attorney, was present.

The minutes of the April 2, 1942, meeting of the Council were read and approved. The committee of men from Lake Preston who wished to consult with the Council relative to the establishment of a hospital, partially financed by FSA money, had been granted an audience, and they were present at this time. Secretary Sherwood read a letter from Mr. Kopprud of Lake Preston, explaining somewhat the project and what was wished. This was amplified by a short talk by Mr. Keith. The matter was discussed at some length by Drs. Hart, Robbins, Brown, Lloyd, Stansbury and Donahoe. Moved by Dr. Lloyd and seconded by Dr. Brown that the Council approve, in principle, the project, providing the hospital is conducted in an ethical manner and under principles approved by the State Hospital Association. Motion carried.

Report of Secretary-Treasurer given. Moved by Dr. Ohlmacher and seconded by Dr. Stansbury that the report be accepted as read, and referred to an auditing committee, together with the books. Motion carried.

Dr. Hart reported that the Committee on Arrangements had functioned, and that the program as outlined in the printed programs would be carried out as far as he knew. This was amended by Dr. Nessa, who reported that Dr. Cutter was unable to be here, and the committee had been able to get Dr. Roy Fouts of Omaha to take his place.

Dr. Duncan asked that the Council give him a letter to be transmitted to Dr. McIntyre, explaining the action of the Council on his communication, relative to priority of feed and seed loans, as taken up at the last Council meeting. Karl Goldsmith agreed to write letter, giving his opinion.

Dr. Sherwood reported that the action of the Council relative to the Writers' Project of the WPA was transmitted to Mr. Lord, but that no answer or request for the articles had been received, so the matter was dropped.

Auditing Committee appointed by Dr. Baughman as follows: Dr. Robbins, chairman, Dr. Lowe and Dr. Brown.

Moved by Dr. Lloyd that bill for $4.50 presented by Dr. Hart for telephone and telegram expense be approved. Seconded by Dr. Ohlmacher. Motion carried.

Moved by Dr. Ohlmacher and seconded by Dr. Mabee that bill for $29.01 presented by Dr. Duncan, for expense of Assignment and Procurement Committee be approved and paid. Motion carried.

Moved by Dr. Stansbury and seconded by Dr. Ohlmacher that necessary mileage expense of Dr. Duncan and of other members of the State Committee on Assignment and Procurement be allowed.

There being no further business, meeting was adjourned.

CLARENCE E. SHERWOOD, M.D., *Secretary.*

Second Meeting of the Council
May 15, 1942

Meeting was called to order by the chairman, Dr. D. S. Baughman, in the private dining room of the Carpenter Hotel at 7:15 A. M. Roll call: The following Councilors were present: Drs. B. M. Hart, N. J. Nessa, C. E. Sherwood, John L. Calene, D. S. Baughman, C. E. Robbins, J. H. Lloyd, W. E. Donahoe, E. M. Stansbury, R. V. Overton and G. E. Whitson.

Minutes of May 13th meeting were read and approved.

It was moved by Dr. Stansbury, that the amount of the bill of Dr. Hart for expenses be allowed at $6.97. Motion carried.

Dr. Nessa nominated as chairman of the Council, Dr. D. S. Baughman. Dr. Lloyd moved and Dr. Calene seconded the motion that the nominations be closed and that the Secretary be instructed to cast a unanimous ballot for Dr. Baughman as chairman for the ensuing year. Motion carried and Dr. Baughman was declared duly elected.

Dr. Robbins, chairman of the auditing committee, presented his report of the audit of the Secretary-Treasurer's books and moved its adoption. Seconded by Dr. Stansbury. Carried.

Dr. Donahoe presented a bill for $12.50, expenses of Radio Committee. Moved by Dr. Calene and seconded by Dr. Nessa that it be allowed. Motion carried.

Communication from the Sixth District recommending a cut in the Secretary's salary was read and discussed at length. Inasmuch as the Secretary-Treasurer is appointed for a term of three years by the Council and his salary fixed by the Council and also due to the fact that the term had one more year to run, it was moved by Dr. Calene and seconded by Dr. Lloyd, that no action be taken for this year. Motion unanimously carried.

The action of the Basic Science law came under discussion. It was pointed out that we were unable to judge as yet, the full value of the law inasmuch as the act specifically exempts students registered and enrolled and in attendance as of March 15, 1939, in recognized schools of medicine, osteopathy or chiropractic schools. Therefore, the law will not become fully active until March 15, 1943.

Dr. Stansbury discussed conditions at the State Hospital in Yankton, pointing out the difficulties the superintendent has in staffing the hospital with medical men, particularly during the present emergency and moved that the Council approve their present method of carrying on during the emergency. After considerable discussion, during which the difficulties of the situation were recognized, it was moved by Dr. Calene and seconded by Dr. Lloyd, that the matter be tabled. Carried.

Dr. Whitson moved, Dr. Calene seconded, that the secretary be authorized expenditure of $10.00 for secretarial fees during the session. Meeting adjourned.

CLARENCE E. SHERWOOD, M.D., *Secretary.*

Report of the Auditing Committee, South Dakota State Medical Association, May 15, 1942

1. Cash taken in, checked against deposit slips in bank, and found correct.
2. All bills paid, checked against cancelled checks from bank, and found correct.
3. Legislative account, checked separately.
4. Accounts received checked against bank deposit slips and found to be correct.

The Committee found the Secretary's books to be complete, in first class shape, and all accounts checking correctly.

The Committee, in behalf of the Council, wishes to thank the Secretary, Dr. C. E. Sherwood, for his capable and efficient handling of the accounts of the State Association.

C. E. ROBBINS, M.D.,
Chairman, Auditing Committee.

Financial Report of Benevolent Fund

Jan. 10, 1942—Minneapolis Draft 3108 Huron Branch	
Total savings plus interest Jan. 1, 1942	$ 694.87
Nov. 7, 1941—Rapid City Auxiliary	2.00
Oct. 8, 1941—Rapid City Auxiliary	4.00
Feb. 13, 1942—Madison District Auxiliary	45.00
May 12, 1942—Rapid City District Auxiliary	19.00
Huron District Auxiliary	30.00
Pierre District Auxiliary	20.00
Mitchell District Auxiliary	10.00
Watertown District Auxiliary	15.00
South Dakota State Medical Association	153.00
May 15, 1942—Sioux Falls District Auxiliary	57.27
Yankton District Auxiliary	6.00
Collection box at meeting	2.60
May 23, 1942—Arnold Schwyzer, M.D.	20.00
May 23, 1942—Balance on hand	$1,078.74

CLARENCE E. SHERWOOD, M.D., *Secretary-Treasurer.*

Secretary's Report

This has been the "off year," legislatively speaking, for South Dakota. There have been, however, several items of interest along legislative lines in the Federal Government. Each time we have received an SOS from the Bureau of Legal Medicine of the American Medical Association, we have responded with urgent letters to our congressmen stating our views. The only tangible results are a nice collection of letters over the congressmen's signatures, assuring us that they were individually glad to receive our views on the subject and that they would consider our views very carefully. I received today, a letter from our junior Senator, telling me that H. R. 4476 passed the senate with the amendments we objected to.

A considerable amount of time has been spent in coöperation with Dr. Duncan in his work on the State Assignment and Procurement Committee.

Your Secretary attended the conference of secretaries of the component societies at the American Medical Association Headquarters, in November. This is always an informational as well as inspirational meeting.

Several trips were made to Sioux Falls to confer with the members of the Inter-Allied Council and local committees, making plans for the May meeting.

Two Council meetings were held during the interim.

Some of the districts have been rather slow in getting in reports due to uncertainties of the times. Some of our district officers have been called into army service and this has delayed the reports.

The following is the analysis of the membership by districts showing a comparison of last year's figures at convention time and total membership attained by the close of the fiscal year.

	May 17, 1941	Dec. 31, 1941	May 12, 1942
District 1	30	35	15
District 2	22	22	16
District 3	23	24	23
District 4	14	15	14
District 5	12	15	14
District 6	24	24	27
District 7	46	50	43
District 8	28	34	29
District 9	49	53	44
District 10	7	8	8
District 11	11	11	10
District 12	13	15	14
	279	306	253

Number of physicians in the state	403
Number of physicians carried as affiliate members	36
Number of members in armed forces	23

Report of Secretary-Treasurer
May 12, 1942

May 17, 1941, balance on hand	$2,353.01	
Receipts:		
Back Dues received for 1941 (27)	270.00	
Social Security refund, C. E. Sherwood	12.00	
1942 Dues, 253 members	2,530.00	
Transferred from legislative fund account	352.42	
		$5,517.43
Disbursements:		
Local expense—Mitchell meeting	$ 42.90	
Speakers travel expense	224.63	
Hotel expense—guests	32.00	
Telephone toll	23.11	
Council expense—meals and mileage	359.75	
Badges—state meeting	20.83	
Postage	39.02	
Committee expense	38.09	
Miscellaneous	5.51	
Journal-Lancet	578.00	
Printing and supplies	94.57	
Bond, Secretary-Treasurer	5.00	
Secretary-Treasurer salary	1,200.00	
Goldsmith—retainer fee and professional service	600.00	
Collector of Internal Revenue, Social Security	24.00	
Delegate, A. M. A.	82.00	
Assessment, Inter-Allied Council	50.00	
So. Dak. State Medical Benevolent Fund	153.00	
Float	1.25	
	$3,573.66	
Balance on hand May 12, 1942	1,943.77	
		$5,517.43

LEGISLATIVE FUND

Receipts:		
Balance on hand 5-18-40	$ 610.46	
Interest 3-31-41	8.99	
Interest 6-30-41	2.32	
Interest 9-30-41	2.33	
Interest 3-31-42	2.35	
Interest 12-31-41	2.35	
		$628.80
Disbursements—5-12-42		
Transfer to general fund, Karl Goldsmith legislative fee and incidental legislative expense as authorized by Council	$ 352.42	
Balance on hand 5-12-42	276.38	
		$628.80

Clarence E. Sherwood, M.D.,
Secretary-Treasurer.

HOUSE OF DELEGATES, SOUTH DAKOTA STATE MEDICAL ASSOCIATION

First Meeting

May 13, 1942

The meeting of the House of Delegates was called to order by Dr. B. M. Hart, president, on May 13, 1942, at 2:15 P. M., in the Carpenter Hotel, Sioux Falls, South Dakota.

Roll call was taken, with the following members being present: Drs. B. M. Hart, N. J. Nessa, J. C. Ohlmacher, C. E. Sherwood, J. R. Westaby, J. L. Calene, H. R. Brown, D. S. Baughman, C. E. Robbins, J. H. Lloyd, R. V. Overton, C. E. Lowe, Wm. Duncan, O. J. Mabee, J. F. Adams, H. W. Sherwood, G. E. Whitson, O. A. Kimble, Wm. Saxton, E. W. Jones, L. J. Pankow, S. A. Donahoe, G. A. Stevens, E. Joyce, F. W. Haas, W. E. Morse, G. W. Mills, R. J. Quinn, D. A. Gregory, and W. E. Donahoe.

Dr. B. M. Hart of Onida gave his presidential address.

The following reference committees were appointed by President B. M. Hart: Reports of Officers—C. E. Robbins, M.D., R. V. Overton, M.D., J. L. Calene, M.D. Resolutions and Memorials—Wm. Saxton, M.D., F. W. Haas, M.D., H. W. Sherwood, M.D. Amendments to Constitution and By-Laws—J. F. Adams, M.D., O. A. Kimble, M.D., G. W. Mills, M.D., F. J. Tobin, M.D., F. G. Totten, M.D. Nominations and Place of Meeting—J. L. Calene, M.D., H. R. Brown, M.D., G. E. Whitson, M.D., O. A. Kimble, M.D., Wm. Saxton, M.D., E. W. Jones, M.D., L. J. Pankow, M.D., E. Joyce, M.D., W. E. Morse, M.D., R. J. Quinn, M.D., C. E. Lowe, M.D., Wm. Duncan, M.D. Credentials Committee—J. F. Adams, M.D., E. W. Jones, M.D., C. E. Lowe, M.D.

Dr. Duncan moved that any physician who is in actual service in the army or navy and was a member in good standing at the time of induction, be considered a full member for purposes of representation. Dr. Calene seconded this motion. Motion carried.

Minutes of 1941 session were presented by the secretary as printed in the July, 1941, issue of The Journal-Lancet. Dr. J. R. Westaby moved they be accepted as printed without reading. Dr. Gregory seconded the motion. Motion carried.

The report of the Secretary-Treasurer was presented.

Dr. Calene gave a report of Councilor District No. 1.

Dr. Brown reported for District No. 2.

Dr. Baughman reported for District No. 3.

Dr. Robbins reported for District No. 4.

Dr. Burman reported for District No. 5.

Dr. Lloyd reported for District No. 6.

Dr. W. E. Donahoe reported for District No. 7.

Dr. F. W. Haas reported for District No. 8.

Dr. G. W. Mills reported for District No. 9.

Dr. R. V. Overton reported for District No. 10.

Dr. C. E. Lowe reported for District No. 11.

Dr. Wm. Duncan reported for District No. 12.

Dr. Baughman moved that above reports be referred to appropriate committees. Reports referred to Committee on Reports of Officers. Dr. Gregory seconded the motion. Motion carried.

The report of the Committee on Scientific Work was presented by Dr. Sherwood.

No report was given by the Public Policy and Legislation Committee.

Dr. Sherwood gave the report of the Committee on Publications and introduced Mr. Cohen, the publisher, who was present. Mr. Cohen greeted the association briefly.

No report was given by the Medical Defense Committee.

No report was given by the Committee on Medical Education and Hospitals.

Dr. Riggs' report for Committee on Medical Economics was read by Dr. Sherwood.

The report of the Committee on Public Health was given by Dr. Baughman.

The report of the Committee on Necrology was read by Dr. Sherwood, having been presented to him by Dr. Dick.

Motion was made and seconded that the above reports be accepted and referred to the appropriate committees. Carried.

Dr. Donahoe gave a verbal report of Committee on Radio Broadcast. Written report given to Secretary.

Dr. Sherwood read Dr. Shirley's report on Editorial Committee.

Dr. Mills presented written report on Medical Licensure Committee to Dr. Sherwood. Dr. Mills also gave a verbal report.

Dr. Sherwood read Dr. Nessa's report of the Committee Advisory to the Women's Auxiliary.

No report was given by Committee on Allied Group. However, it was reported by Dr. Hart that this meeting was the result of the committee's activities and coöperation in the Allied Profession. (Report from chairman, N. K. Hopkins, received by mail subsequently.)

Report of Committee on Military Affairs was read by Dr. J. R. Westaby.

No report was given by Committee on Radiology.

No report was given by Committee on Post Graduate course.

Dr. Sherwood gave a verbal report for the Committee on Spafford Memorial Fund.

No report was given on Ophthalmology and Otolaryngology committee.

Dr. Van Demark's report on Orthopedics was read by Dr. Sherwood.

The report on the Social Security committee was given by Dr. Cook.

Dr. Sherwood read report on Maternal and Child Welfare committee presented by Dr. Jernstrom.

Motion was made and seconded that above reports be accepted and referred to appropriate committees.

New Business:

Dr. Jones presented two resolutions from their district: One relative to the salary of the Secretary of the Association, and one relative to the policy of continuing one man as delegate to the American Medical Association. It was pointed out that the matter of the salary of the Secretary came under the province of the Council. Dr. Jones then moved that this resolution be referred to the Council for action. Motion seconded by Dr. Lloyd. Motion carried.

At the request of the Seventh District society the following men who have been elected honorary members of the District Society were proposed to be elected as affiliate members: Dr. Gilbert Cottam, Dr. Chas. Culver, Dr. Thomas J. Billion and Dr. H. R. Hummer. Moved by Dr. Baughman that this request be granted. Seconded by Dr. Robbins. Motion carried.

Dr. Duncan proposed an increase of $5.00 in the state assessment. Discussed briefly by Dr. Mabee, Dr. H. W. Sherwood and Dr. E. Joyce. Moved by Dr. Calene and seconded by Dr. Saxton that the matter be tabled until evening meeting.

There being no further business, meeting was adjourned.

CLARENCE E. SHERWOOD, M.D., *Secretary.*

HOUSE OF DELEGATES, SOUTH DAKOTA STATE MEDICAL ASSOCIATION

Second Meeting

May 13, 1942

The second meeting of the House of Delegates was called to order at 8:30 P. M., by the president, Dr. B. M. Hart, at the Carpenter Hotel in Sioux Falls. Roll call was taken, with the following members present: Drs. B. M. Hart, N. J. Nessa, C. E. Sherwood, J. L. Calene, H. R. Brown, D. S. Baughman, C. E. Robbins, J. H. Lloyd, W. E. Donahoe, R. V. Overton, C. E. Lowe, Wm. Duncan, O. J. Mabee, J. F. Adams, H. W. Sherwood, G. E. Whitson, O. A. Kimble, Wm. Saxton, L. J. Pankow, Geo. A. Stevens, C. J. McDonald, E. Joyce, W. E. Morse, G. W. Mills, F. G. Totten, and D. A. Gregory.

The minutes of the first meeting of the House of Delegates were read and approved.

Dr. N. J. Nessa, president-elect, gave his address.

The report of the Committee on Nominations and Place of Meeting was given, the following nominations as outlined by the by-laws of the association were made:

President-elect, 1942-43—Dr. J. C. Ohlmacher and Dr. B. M. Hart.
Vice-President, 1942-43—Dr. D. S. Baughman and Dr. R. E. Jernstrom.
Councilor, Madison District No. 3, 1942-45—Dr. G. E. Whitson.
Councilor, Huron District No. 5, 1942-45—Dr. Wm. H. Saxton.
Councilor, Mitchell District No. 6, 1942-45—Dr. J. H. Lloyd.
Councilor, Sioux Falls District No. 7, 1942-45—Dr. W. E. Donahoe.
Delegate, A. M. A. Sessions, 1943-44—Dr. N. J. Nessa.
Alternate Delegate, A. M. A. Sessions, 1943-44—Dr. J. C. Ohlmacher.
Place of Meeting, 1943—Rapid City, South Dakota.

Dr. Hart appointed Drs. Whitson, Lloyd and Brown as tellers.

There were no nominations from the floor.

Election of officers was held by ballot, with the following officers being elected:

President-elect, 1942-43—Dr. J. C. Ohlmacher.
Vice-President, 1942-43—Dr. D. S. Baughman.
Councilor, Madison District No. 3, 1942-45—Dr. G. E. Whitson.
Councilor, Huron District No. 5, 1942-45—Dr. Wm. H. Saxton.
Councilor, Mitchell District No. 6, 1942-45—Dr. J. H. Lloyd.
Councilor, Sioux Falls District No. 7, 1942-45—Dr. W. E. Donahoe.
Delegate, A. M. A. Sessions, 1943-44—Dr. N. J. Nessa.
Alternate Delegates, A. M. A. Sessions, 1943-44—Dr. J. C. Ohlmacher.
Place of Meeting, 1943—Rapid City, South Dakota.

Dr. Robbins gave the report for the Committee on Reports of Officers. Dr. Robbins moved that adoption of these reports as presented to the committee be made. Motion seconded by Dr. Kimball. Motion carried.

Dr. Saxton gave the report of the Committee on Resolutions and Memorials as follows:

Radio Committee: We recommend a continuance of the broadcast by the Medical Association. We further recommend that the committee procure as many papers as possible from the membership and secure the rest from other sources like the American Medical Association. We also wish to commend the committee (W. E. Donahoe, chairman, S. M. Hohf, and R. E. Jernstrom) for the good work they have done in carrying on during the past year and we further recommend that a vote of appreciation be extended to Dr. H. R. Hummer, Dr. Billingsly and other men instrumental in reading these talks. We further recommend that a letter of appreciation from the Association be sent to stations KSOO and KABR for their coöperation in this project.

Military Affairs: We wish to commend the state Committee on Procurement and Assignment in its efficient handling of military affairs both from the physician's standpoint and the welfare of the citizens. We recommend that the names of those physicians in military service of the country be made a portion of our official records and so published.

Medical Licensure: Recognizing that the shortage of doctors in South Dakota is an acute problem, we recommend that article 2 of this committee's report providing for temporary licensure be adopted but that article 1, of this report, being so contrary to present laws, we suggest it be referred to the legislative committee for further study.

Necrology: We recommend that this committee's report be adopted as read and made a portion of our records and published in the JOURNAL-LANCET.

Medical Economics: We suggest that the recommended use of "M.D." rather than "Dr." be adopted for general usage. We further suggest that inasmuch as it has been a number of years since the last fee bill for compensation cases was drawn up, that it might be advisable to have the Economics committee submit a new fee schedule for the Medical Association to adopt and all abide thereby.

Public Health—Tuberculosis: We appreciate that the present hospital facilities are inadequate for the tuberculosis load of the state. We recommend that we support the South Dakota State Board of Health in any plan they may work out to remedy this situation. We further recommend that more stringent isolation regulations for active cases of tuberculosis be adopted by the State Board of Health. We endorse the committee's recommendation for an active campaign of early case findings by examination of contacts with active cases. We further recommend that the report of the sub-committee on cancer be adopted as being sound. We also recommend the adoption of diphtheria and smallpox immunization program.

Dr. Saxton moved the adoption of this report. Discussion was held relative to issuance of temporary licenses. Dr. Pankow moved that the various reports of this committee be voted upon separately, especially as pertains to Medical Licensure. Motion seconded by Dr. Kimball. Moved by Dr. Pankow and seconded by Dr. Kimball that an amendment to this motion be passed, that that portion of the report pertaining to Medical Licensure be tabled. Motion carried 14 to 5. Motion accepting report of committee passed.

Dr. J. F. Adams reported for the *Committee on Amendments to Constitution and By-Laws.* General discussion followed. Dr. Pankow moved that the legislation in regard to Medical Defense be referred back to the Legislative Committee for another year. Seconded by Dr. Robbins. Motion carried.

Dr. Pankow moved that the House of Delegates instruct the proper committee to clarify our By-Laws, setting forth the status of the affiliate members, and giving them privileges and honor instead of taking their privileges away from them as pertains to voting power and holding office, and that the matter be referred back to the next meeting of the House of Delegates. Motion seconded by Dr. Whitson. Motion carried.

No report was given by *Credentials* committee.

Old Business:

Dr. Gregory moved and Dr. Pankow seconded the motion that the resolution presented by Dr. Jones be tabled because the reason for the resolution no longer exists. Motion carried.

General discussion by Dr. Duncan, Dr. Lloyd, Dr. Joyce, and Dr. Pankow and Mr. Goldsmith regarding Dr. Duncan's proposal for additional dues or assessment. Moved by Dr. George Stevens that Dr. Duncan's proposal be tabled and referred back to local societies, to be brought up at next meeting. Seconded by Dr. Calene and Dr. Whitson. Motion carried.

Moved by Dr. Pankow that the Council be asked to give real consideration to the question of dropping the Secretary's salary to a level compatible with the society's income. Discussion by Dr. Duncan, Dr. Brown and Dr. George Stevens. Further discussion of Secretary's salary by Dr. Mabee, Dr. Adams, Dr. Duncan, Dr. Stevens, Dr. Pankow, Dr. Lloyd, and Dr. Sherwood. Dr. Pankow suggested that the matter be dropped at this time, as Council members know feeling of delegates.

New Business:

Dr. Shirley presented a report on Farmers' Aid Corporation. Discussion followed as to payment of attorney's fees.

Dr. Sherwood discussed the matter of the Joint Benevolent Committee. Gave financial report of fund. Total of $992.87. General discussion, as to placing money in Defense Bonds. Moved and seconded that the South Dakota State Medical Association participate in contributing to the Benevolent Fund the same as they have in the past, that is, 50c a member. Motion carried.

Discussion by Dr. Martin, Dr. Whitson, Dr. Duncan, Dr. Robbins, Dr. Sherwood, and Dr. Hart relative to Pierre District Medical Aid Association.

There being no further business, meeting was adjourned.

CLARENCE E. SHERWOOD, M.D., *Secretary.*

REPORT OF COMMITTEE ON ARRANGEMENTS

Sixty-first Annual Session, Sioux Falls, South Dakota, May 13, 14, 15, 1942. Convention Headquarters at Carpenter Hotel.

BUSINESS SESSION

Wednesday, May 13, 1942
(Carpenter Hotel)

10:00 A. M. Council meeting.

2:00 P. M. House of Delegates meeting. Address—President B. M. Hart. Committee Reports. New Business.

8:00 P. M. House of Delegates meeting. Address—President-elect N. J. Nessa. Election of Officers. Action on Reports.

Friday, May 15, 1942

7:00 A. M. Council meeting.

SCIENTIFIC PROGRAM

Thursday, May 14, 1942

9:00 A. M. The Treatment of the Patient Over Fifty—Edward L. Tuohy, M.D., Duluth, Minn., Chief in Medicine, Duluth Clinic. Discussion—John L. Calene, M.D., Aberdeen.

10:10 Intermission.

10:30 Shock Treatment in Mental Disease: Pharmacological and Physical—Hewitt B. Hannah, M.D., Minneapolis, Consultant in Nervous and Mental Diseases, University of Minnesota.

11:30 The Role of the Physician in Civil Defense—Wallace D. Hunt, M.D., Omaha, Regional Medical Officer Civil Defense, 7th Corps Area.

INTER-ALLIED PROGRAM

Sioux Falls Coliseum
Thursday, May 14, 1942
Presiding: C. M. Austin, Sioux Falls,
President Inter-Allied Council

2:00 P. M. Symposium: "Relationship of My Profession to National Defense."

Roy W. Fouts, M.D., Omaha, Procurement and Assignment Chairman, 7th Corps Area.

Frederick F. Molt, Great Lakes, Ill., D.D.S., F.A.C.D., F.I.C.D., Commander, (DC) U.S.N.R., Assistant Senior Dental Officer, U. S. Naval Training Station.

Dean E. R. Searles, Chicago, Ill., Dean of Pharmacy, University of Illinois.

Sister M. Berenice, Milwaukee, Wis., Dean of Nursing, Marquette University.

Malcolm T. MacEachern, M.D., Chicago, Ill., Associate Director and Chairman, Administrative Board, American College of Surgeons.

3:40 Discussion Period.

4:30 Adjournment.

6:30 Banquet for Inter-Allied Professions, Sioux Falls Coliseum. (Entertainment and Dancing.)

Friday, May 15, 1942

9:00 A. M. Common and Obscure Skin Diseases. Illustrated by Kodachrome. S. E. Sweitzer, M.D., Minneapolis, Clinical Professor of Dermatology and Syphilology, University of Minnesota.

10:00 Intermission.

10:30 Roentgen Diagnosis of Acute Abdominal Disorders—Leo G. Rigler, M.D., Minneapolis, Professor of Radiology, University of Minnesota. (Physicians having interesting films are invited to submit them for interpretation.)

1:00 P. M. Discussion of Iron, Liver Extract and Vitamins in the Treatment of Various Types of Anemia—Herbert Z. Giffin, M.D., Rochester, Minn., Head of Section, Mayo Clinic; Professor of Medicine, Mayo Foundation. (To be followed by question and answer period.)

2:30 Abdominal Pain and Its Local Significance—Arnold Schwyzer, M.D., St. Paul, Minn.

SOUTH DAKOTA ACADEMY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

Officers: President, S. A. Keller, Sioux Falls; vice-president, Don Mabee, Mitchell; secretary-treasurer, J. D. Alway, Aberdeen.

Program—Thursday, May 14, 1942

9:30 A. M.—"Acute Suppurative Otitis Media—A Reconsideration"—Charles E. Connor, M.D., St. Paul, Assistant Clinical Professor of Otolaryngology, University of Minnesota Medical School.

10:30 "Diagnosis and Treatment of Uveitis"—Hendrie W. Grant, M.D., St. Paul.

11:30 "Developments in Contact Lens Technique"—Albert L. Anderson, Minneapolis, Head of Scientific Department, N. P. Benson Optical Co., Inc.

REPORT ON MILITARY AFFAIRS

Mr. President, Members of the House of Delegates:

Your committee on Military Affairs has not been able to meet personally, so the work has been carried on by correspondence. One of the members, Dr. P. T. Geyerman of Hot Springs, is deceased.

The chairman of the committee met with the Military Affairs committee of the American Medical Association in 1940 and 1941 and also attended the meeting held in Chicago in February of this year and was in conference with Major Seeley, head of the Procurement and Assignment Service in Washington, D. C., under the direction of the Surgeon General of the United States.

Following out the program outlined by the Military Affairs Committee of the American Medical Association in 1940 the physicians of the United States have made preparation for the war far in advance of Jap Sunday and conceived a plan which is the basis for the activities of the now smoothly working machine of the Procurement and Assignment Service whereby thousands of physicians have taken their positions as officers in the Medical Corps of the Army and Navy of the United States of America.

Military Affairs committees have been appointed in each district medical society in the state and have been working with the Chief of the Procurement and Assignment Service, Dr. William Duncan, which is a part of the seventh district of the United States with headquarters in Omaha, Nebraska.

The committee has attempted to secure the names of the physicians who have gone into the service, a list which is not by any means complete is here presented with the hope that if there are errors or names not reported you will give the correction or supply the names of those not reported here.

Adams, M. E., Clark.
Auld, Merritt, Yankton.
Bliss, R., Sioux Falls.
Billion, T. J., Jr., Sioux Falls.
Bloemendaal, G. J., Ipswich.
Burgess, R. E., Gettysburg.
Bushnell, J. W., Elk Point.
Catey, Robert, Mobridge.
Clark, B. S., Spearfish.
Cooper, George, Watertown.
Craig, Allen, Sioux Falls.
Davidson, H. E., Lead.
Dick, Fred, Vermillion.
Duimstra, Fred, Vermillion.
Dyar, B. A., DeSmet.
Ferris, W. T., Chamberlain.
Fitzgibbon, G., Sioux Falls.
Gelber, M. R., Aberdeen.
Hackett, R. F., Parker.
Hanson, O., Sioux Falls.
Hansen, H. F., Vermillion.
Hayes, Paul W., Hot Springs.
Jones, J. P., Mitchell.
Lovre, S. P., Montrose.
Mallory, F. J., Yankton.
McCarthy, P. V., Aberdeen.
Merryman, M. P., Rapid City.
Neisius, Frank A., Platte.
Nyquist, R. H., Fort Meade.
Salladay, I. R., Pierre.
Schuchardt, I. L., Aberdeen.
Sherill, S. F., Belle Fourche.
Thompson, Arnold, Sioux Falls.
Tobin, L. W., Mitchell.
Williams, F. E., Wakonda.
Zellhofer, H., Sioux Falls.

J. R. WESTABY, M.D., *Chairman.*

REPORT OF THE COMMITTEE ON INTER-ALLIED ACTIVITIES

Your Committee on Inter-Allied Activities submits the following report.

This year's convention being an Inter-Allied convention speaks for itself in saying that the Inter-Allied life of the various groups is far from being dead although there have been no local meetings of the district Inter-Allied groups as was worked out a few years ago when the organization was first formed.

The Inter-Allied Council has had three meetings during the year to try to settle up and dissolve the Farmers Aid Corporation. It is in process of dissolution now and we hope that there may be some more funds to distribute to the member groups that did not receive all of their fees in full for the services rendered during the service period. However, we are not in a position at present to state what the result will be but court proceedings in the matter have been started.

Naturally as this is legislative year and a session of the legislature is in the offing it is important that the legislative committees of the five member groups consult with each other so as to work for the common good and advancement of the various legislative programs and to be on guard against the pernicious legislation which may be introduced by the various non-medical groups.

N. K. HOPKINS, M.D., Chairman.

REPORT OF COMMITTEE ON ADVISORY WOMAN'S AUXILIARY

As chairman of the Committee on Advisory Woman's Auxiliary I beg to submit the following report:

The committee begs to report that during the current year, the president of the Woman's Auxiliary to the South Dakota State Medical Association, Mrs. Fredrick C. Nilsson of Sioux Falls, has consulted our president, Dr. Hart, and Dr. Donahue, radio program chairman, as well as our committee at various times relative to meetings pertaining to the auxiliary activities and has rendered a laudable service to our profession. The committee wishes to express its thanks to the Auxiliary and feel that their interest and labors are duly appreciated and commended.

N. J. NESSA, M.D., *Chairman.*

REPORT OF EDITORIAL COMMITTEE

The JOURNAL-LANCET is the designated publication of the South Dakota Medical Association. The contract of the Council with the JOURNAL-LANCET extends over a period of another year with the price of the JOURNAL being $2.00 per year, per member.

Besides the publication of the meetings and the activities of the Medical Association, there have been reports of the Committee on Medical Preparedness by the Corps Area chairman, report of the Woman's Auxiliary Benevolent Association. In addition the letters sent out by the Secretary have been published and there have been numerous contributed articles throughout the past year, besides the papers presented at the annual meeting of the Association.

J. C. SHIRLEY, M.D., *Chairman.*

REPORT OF COMMITTEE ON PUBLICATIONS

The Committee on Publications wishes to report that the 5 year JOURNAL-LANCET contract is still in force and JOURNAL-LANCET will be the official publication of the Association until July, 1943.

CLARENCE E. SHERWOOD, M.D., *Secretary.*

REPORT OF COMMITTEE ON RADIO BROADCASTS

The State Medical Association has been conducting a radio broadcast every Sunday at 1:15 P. M. from stations KSOO at Sioux Falls, and KABR of Aberdeen. This radio time has been donated to the association and is considered by the studios to be the most valuable of their free will programs. The medical information put out in these papers is of great public interest, largely because the papers have been prepared by physicians of the state.

Your committee and the studio attendants know of the letters and words of acknowledgement from the public, and so feel that the broadcasts are worthwhile and recommend that this radio time should be retained and used in some way, especially now in these days of war and sacrifice. At the same time wherein a great part of their value lies in the fact that this broadcasting information is prepared by local physicians. The committee is satisfied that it is impossible to continue to get material from our membership. We gave up trying several months ago and since have been on our own to get medical papers of information to the studios each Sunday. This is attested by the fact that we sent out a special plea to two districts of the state with easy method of reply with the following disheartening results . . . to 24 in one district, with only 10 replies and 4 papers; and to 35 in another district, with 7 replies and only 3 papers.

Your committee sincerely hopes that some way can be discovered for the State Association to continue radio broadcast and respectfully request serious consideration by the association.

The committee wishes to draw up letters of thanks and appreciation to the two broadcasting stations which they should like to have signed also by the association president and secretary.

The committee wishes to acknowledge the faithful service of Dr. H. R. Hummer in so proficiently and professionally reading these papers over KSOO and to Dr. P. R. Billingsley in so willingly carrying on the few times in Dr. Hummer's absence.

During the year the same papers have been read at the same time over both KSOO and KABR. An effort has been endeavoring to also broadcast from Rapid City but so far it has been unsuccessful.

Radio Committee:
WILL E. DONAHOE, M.D., *Chairman*
S. M. HOHF, M.D.
R. E. JERNSTROM, M.D.
PAUL G. BUNKER, M.D.

REPORT OF COMMITTEE ON NECROLOGY

As chairman of the Committee on Necrology for the State Association I am submitting the enclosed information relative to doctors who have died in the past year.

PETER THOMAS GEYERMAN, M.D., Hot Springs, South Dakota. Born August 21, 1874, in Shakopee, Minnesota. Grammar school in Brewster, Minnesota; graduate of University of Minnesota School of Medicine, 1899; postgraduate work in Vienna, Austria. First practice at Worthington, Minnesota; Hot Springs, South Dakota, 1910-1942, associated with Drs. J. B. Naftzger and F. E. Walker. Died January 3, 1942, of cerebral hemorrhage. Aged 67.

HARRY MILTON FREEBURG, M.D., Watertown, South Dakota. Born March 11, 1876, at Nashua, Iowa. Graduate Iowa State Teachers College, Cedar Falls, Iowa; taught school several years. Graduate University of Minnesota College of Medicine, 1904. Practiced at Watertown 1905-1942; founder of Northwestern Clinic, Watertown, 1921. Spanish War Veteran. Died January 7, 1942, at Tama, Iowa. Aged 66.

GEORGE FREDRICK SACHRITZ, M.D., Faulkton, South Dakota. Born at St. Louis, Missouri, September 28, 1894. Public schools, St. Louis; St. Louis University School of Medicine, 1916; interned at St. Louis Hospital, St. Louis. World War veteran; Lieut. Medical Corps, Camp Funston, Kansas. Practiced at Faulkton 1920-1941. Member of County Hospital Board; supt. County Board of Health. Died June 1, 1941. Aged 46.

JAMES CLAIR ASH, M.D., Lake Andes, South Dakota. Born October 16, 1871, at Morocco, Newton county, Indiana. Barnes Medical College, St. Louis, Missouri, 1899. Ear, eye, nose and throat, Rush Medical College, Chicago, Illinois. Practiced at Garden City, South Dakota, 30 years; Lake Andes, 3 years. Member South Dakota state legislature 1927-1929. Died July 2, 1941, at Rawlin, Wyoming. Aged 69. Acute heart attack.

JOSEPH LAWRENCE BETTAG, M.D., Kimball, South Dakota. Born at Oxford, Johnson county, Iowa, March 18, 1891. Marquette University School of Medicine, Milwaukee, Wisconsin, 1924. Discharged from U. S. Military Service, May 29, 1918, for physical disability existing before induction. Died May 9, 1940, Madera county, California. Aged 49. Tuberculosis.

JOHN B. WALTON, M.D., Martin, South Dakota. Born 1882. Bennett College of Eclectic Medicine and Surgery, Chicago, Illinois. Died January 21, 1941, Rochester, Minnesota. Acute ulcerative endocarditis. Aged 58.

CLARENCE LEONARD OLSON, M.D., McIntosh, South Dakota. Born January 27, 1882, at Moline, Illinois. Hampton High School, Hampton, Iowa; first year of medicine at University of Minnesota School of Medicine; three years at Iowa State University School of Medicine, 1908. Located Onako, South Dakota, July 1908; associated with Dr. F. W. Creamer at LeBeau, South Dakota, 1909; McIntosh, South Dakota, 1910-1941. Died at University Hospital, Minneapolis, Minnesota, June 5, 1941. Aged 59. Coronary sclerosis.

PALMER E. BRANDON, M.D., Sioux Falls, South Dakota. Born at Canton, South Dakota, September 13, 1877. Common school, Campbell county, South Dakota; taught country school while taking high school work by correspondence; attended Augustana College, Canton, South Dakota; B.A. degree from State University of South Dakota, 1904; Northwestern University School of Medicine, Chicago, 1907; interned at Mercy Hospital, Chicago. Located Jackson, Minnesota, 1909, associated with Dr. Benson in hospital. Married July 8, 1912, to Frances E. Marshall, R.N., and moved to Sioux Falls. Was superintendent of county board of health and assistant county physician. Stricken at Federal Bldg., Sioux Falls, while examining selectees; died January 21, 1942, of coronary thrombosis. Aged 59.

Committee on Necrology:
Louis C. Dick, M.D., *Chairman*
J. V. McGreevy, M.D.
R. V. Overton, M.D.

REPORT OF COMMITTEE ON MEDICAL ECONOMICS

Use of "M.D.":

Statement: All too often doctors of medicine use the title "Dr." rather than "M.D." in their signatures and on their stationery and prescription blanks.

Suggestion: The title "M.D." is an earned title and cannot be used by any other professions outside of Doctors of Medicine. Its unswerving use would be a protection to both the profession and the public.

Fee Schedules for Industrial Accidents:

Statement: In 1922, the State Medical Association appointed a committee of physicians to submit a schedule of fees applicable under the newly adopted Workmen's Compensation Law of this state. Such a fee bill was submitted and adopted by the Society as well as by the Industrial Commissioner. Within the past few years there has been an inclination on the part of the insuring companies to compromise with the physicians on the statement that, "Other physicians would do the work on such a compromise basis." It should be remembered that the premium rate charged by the insuring companies is based on the South Dakota law, which has not changed so far as liability for physicians' services is concerned since the adoption of the law. For instance, the original fee schedule committee recommended a charge of $125.00 for herniotomies, but a recent printed schedule of a South Dakota insurance company suggests $50.00; other suggested changes are all for a lesser amount than the original fee bill. It must be remembered that there is a $100.00 limit for physician's services, so that any suggested amount in excess of that figure would not be the responsibility of either the employer or the insuring company. However, the Industrial Commissioner has ruled that First Aid, where two physicians have rendered services, may be charged in addition to the $100.00 limit.

Suggestion: It would seem that the State Medical Association could well agree on a definite schedule of fees and abide by that schedule and thus discourage "shopping around" by the insuring companies.

Group Insurance:

Two years ago, with the consent of the Council, the Fourth District Medical society undertook the experiment of Group Insurance for certain selected clients of the Farm Security Administration. This idea of Group Insurance is in force in many stricken localities, not for the indigent, but for rehabilitation clients.

In considering this plan, it should be remembered that without the help of the Federal agency in rehabilitating the farmer of central South Dakota during the years of drouth and grasshoppers many families would have been forced to leave the state. Today, as a result of that rehabilitation, thousands of our farmers are rapidly regaining their earning power. The physicians are coöperating in this rehabilitation from the standpoint of medical care, and feel that they are doing their share, and also feel that the future prosperity of our farm families is necessary to the future practice of medicine. It should also be remembered that FSA clients are eligible for membership only until and only for that period of time during which they are indebted to the FSA for borrowed money.

T. F. Riggs, M.D., *Chairman*
G. I. Cottam, M.D.
Harold Miller, M.D.

REPORT OF ADVISORY COMMITTEE ON MATERNAL AND CHILD HEALTH

Recommendations:

I.

1. To adopt a long range plan to the end that every child be immunized against Diphtheria by the time it is 9 months old and against Smallpox before reaching the second year of life.

Method of Accomplishing Plan

1. Each physician to assume the responsibility of seeing that every child under his care be immunized.

2. For those people who are not financially able to have these immunization procedures done, that free immunization facilities be provided through the medium of an immunization clinic.
3. That a publicity campaign be conducted, promoting the plan as proposed by radio, newspapers and pamphlets through the State Medical Association coöperating with the State Health Department.

II.

The Advisory Committee on Maternal and Child Health approves and favors continuation of the State Board of Health program now being carried for the promotion and betterment of Maternal Health; especially do we recommend the program carried by the local Public Health nurses.

R. E. JERNSTROM, M.D., *Chairman*
GOLDIE ZIMMERMAN, M.D.
MERRILL PANGBURN, M.D.

REPORT OF COMMITTEE ON ORTHOPEDICS

Activities, April 1, 1941 to March 31, 1942

1.	Number of Clinics			10
	Attendance			336
2.	New Cases Authorized			198
3.	Cases Treated			339
	Orthopedic	197		
	Plastic	53		
	Other	10		
	Eye Cases	79		
4.	Days Hospital Care Provided			9,427
5.	Days Convalescent Care Provided			2,971
6.	Surgeon's Fees Paid			14,319.32
	In State	$9,868.32		
	Out of State	4,451.00		
7.	Hospital Fees Paid			36,688.73
	In State	$31,368.87		
	Out of State	5,319.86		
8.	Convalescent Fees Paid			6,298.60
	In State	$6,078.65		
	Out of State	219.95		
9.	Expended for Appliances			4,360.58
10.	Expended for Transportation and Guardian's Expense			219.95
11.	Children on Register April 1, 1942			1,804
	Poliomyelitis		276	
	Tuberculosis of bone or joint and osteomyelitis		99	
	Spastic Paralysis		70	
	Harelip and Cleft Palate		129	
	Club Foot		124	
	Congenital Dislocation of Hips		82	
	Other Congenital Defects		133	
	Injuries		166	
	Foot Disabilities		111	
	Eye Defects		234	
	All Other Disabilities		302	
	Provisional		78	

G. E. VAN DEMARK, M.D., *Chairman.*

REPORT OF COMMITTEE ON PUBLIC HEALTH

As general chairman of the Public Health Committee, I have requested the members of the various sub-committees to furnish reports of their activities and achievements during the past year and to make recommendations for the future.

SUB-COMMITTEE ON TUBERCULOSIS

The sub-committee on tuberculosis submitted two reports. EDWARD W. JONES, M.D., reported as follows:

"I have written Dr. Jernstrom for a report from his section and told him to write you.

"I haven't so much to report; it is more of a personal nature than it is public health nature. We have the Mitchell schools tested to the extent of practically 100 per cent for tuberculosis. In the last few years I have tubercularized about 5,000 pupils. This year we tubercularized about 1,000 new ones and have had most of the follow-ups on the reactors. We are running about 20 to 25 cases on air all the time, some of which have had residences in the state sanatorium and some private cases. Our schools are very free from tuberculosis due largely to the fact that we have case finding methods and that we have a very carefully inspected milk supply over a period of years. Bone tuberculosis in the Mitchell territory is a curiosity.

"I regret very much that our state sanatorium could not be enlarged an appreciable amount by some help from some of the government agencies such as the WPA, etc. In the first place, we cannot handle efficiently a large percentage of the tubercular cases and they remain as a source of infection for the balance of the state. Secondly, this war is going to increase our tubercular incidence a large amount and that means the state sanatorium will be simply overwhelmed with cases that will result from the rugged campaign and exposures that our soldiers are subject to.

"I would like to see that this society go on record memorializing the state to enlarge their sanatorium an appreciable amount."

W. L. MEYER, M.D., Superintendent of the South Dakota State Sanatorium for Tuberculosis has submitted the following report:

"In the treatment of pulmonary tuberculosis, the most important thing is strict rest, both mental and physical.

"In following an actual series of cases, we find that a considerable number of these cases of active pulmonary tuberculosis will clear up on strict bed rest alone. This rest should be both mental and physical. Perhaps the mental factor is as great as the physical. In this respect, an attempt is being made at the South Dakota State Sanatorium by Social Service and by the Occupational Therapist to keep the mind of the patient occupied in order that we may as nearly as possible secure mental rest for the individual. We believe this has been accomplished to a greater extent than previously.

"All cases of active pulmonary tuberculosis are placed on strict bed rest as soon as they are admitted to the sanatorium and kept there until their condition improves sufficiently so that graded exercise may be allowed. After a short period of observation, if it is thought that the patient's condition will not improve with bed rest alone, other methods are added to make this bed rest more effective.

"For a number of years the ordinary treatment of tuberculosis such as phreniphraxes, pneumonolyses, and pneumothoracies have been used at the sanatorium. For the limited number of cases in which this type of treatment can be used, satisfactory results have been produced. There are, however, a certain number of cases in which the tuberculosis is so far advanced, the lung has become adherent to the chest wall so that a pneumothorax cannot be instituted, and the disease is so extensive that a phreniphraxis will not control the tuberculosis. In these cases added surgical procedures are required.

"This last fall, one of the large rooms at the sanitorium was rebuilt for a surgery, including a supply room, and a portion of one of the wards has been converted into a surgical floor.

"At this time, thirteen different patients have had thoracoplasties at the sanatorium. So far sufficient time has not elapsed to estimate the number of these patients that will have a consistently negative sputum following their surgery. A number of these patients have only had their first stages and will require additional surgery before we can hope to see a satisfactory result. There are still three individuals at the sanatorium that are in a satisfactory clinical condition and who will probably have their surgery yet this spring.

"From the appearance of the X-ray and sputum on the patients that have had their thoracoplasties completed, we believe that the results of the surgery at the sanatorium will compare very favorably with the results of the major chest surgery that is performed in other sanatoriums.

"At this time all major surgery is being performed by the sanatorium staff.

"A number of individuals with a comparatively minimal pulmonary tuberculosis will develop ulcerations in the trachea or in the larger bronchi. These ulcerations materially retard the healing of the tuberculosis in the lungs and if the tuberculosis in the lungs has healed, these ulcerations and granulations may cause a persistently positive sputum. Arrangements have been completed with a bronchoscopist to examine patients at the sanatorium who are suspected of having a tuberculous tracheobronchitis.

"Two individuals have definitely shown an active tuberculous tracheobronchitis and have been treated by the direct application of a 40 per cent silver nitrate solution. Both of these individuals have apparently had complete healing of their ulcerations and granulations.

"We hope that sometime soon it may be possible for the sanatorium to purchase a bronchoscope and that one of the staff members may take a short course in bronchoscopy in order that the work may be done by the sanatorium staff. This will materially reduce the cost of operation.

"Cystoscopic examinations for suspected genito-urinary tuberculosis at the sanatorium have been performed by a consulting urologist and during the past year, two nephrectomies have been performed for far advanced genito-urinary tuberculosis.

"Recently pens have been completed and arrangements made for the housing of guinea pigs at the sanatorium in order that the advantage of animal inoculation in questionable cases might be had.

"The subcommittee on Tuberculosis wishes to make the following recommendations:

"A campaign should be maintained to detect early cases of tuberculosis in order that the disease may be treated at the most opportune moment. This campaign to detect early cases of tuberculosis should consist of testing as many individuals by skin tests as possible. We recommend that all school children be tested and that the positive reactors be X-rayed. As many other large groups as possible should be tested by this means in order that active cases of tuberculosis might be detected and isolated from their co-workers before they have a chance to infect other individuals, and so decrease the number of workers that might have tuberculosis and that may be gainfully employed at this time. Tuberculin tests could be very well carried out by companies employing a large group of people and requesting that they secure an X-ray on all positive reactors.

"New employees should be examined before going to work.

"An active campaign should be carried on for the detection of early cases by the examination of all contacts with active cases of tuberculosis.

"The sanatorium will furnish without charge a report on any chest X-ray to residents of the state. Any physician in the state who might be in doubt concerning the diagnosis of a chest X-ray should be requested to forward it to the sanatorium for interpretation.

"Because of the comparatively large number of individuals that have no appreciation of public health measures, we wish to recommend that a public health regulation be established compelling the isolation of all cases of active tuberculosis under conditions approved by the State Board of Health.

"We wish to recommend that there be closer association between the South Dakota State Medical Association, South Dakota State Board of Health, and the South Dakota State Tuberculosis Association in order that a more active campaign might be maintained for the detection and isolation of all individuals with an active tuberculosis."

SUB-COMMITTEE ON MENTAL HYGIENE AND CHILD WELFARE

Goldie E. Zimmerman, M.D., *Chairman*, reports the following:

"The activities of the committee on Mental Hygiene and Child Welfare have been very limited.

"Regarding Child Welfare, Mrs. Grace Martin, Director of Child Welfare in the State Social Security Department, together with her social workers, have a very well organized plan and are doing good work.

"The problem of Mental Hygiene is a vital one and the committee feel that some effort should be made on the part of the society to interest physicians in this problem. So far, all that is being done is through the efforts of Dr. Willhite and his staff, consisting of Dr. J. H. Craft, Miss Fosse, Social Worker, and Miss Bermeister, Psychometrist."

SUB-COMMITTEE ON SYPHILIS CONTROL PROGRAM U.S.P.H. SERVICE

Anton Hyden, M.D., reports as follows:

"The report of the sub-committee on Syphilis Control Program, U.S.P.H. Service, is as follows:

"The plan of Chemical Quarantine of Syphilis has had very favorable results. The U.S.P.H.S. consultants inform us that under this plan the findings and holdings of cases in our state compare very favorably with the case finding and holding activities in the better venereal clinics in the larger cities.

"The blood test program under Selective Service has also made it necessary to markedly expand the laboratory facilities. This has been done with the federal funds granted to the state for venereal disease control purposes."

SUB-COMMITTEE ON CANCER

J. C. Ohlmacher, M.D., submitted a report in which he emphasized the importance of increasing the activity of this committee. He recommends that the Women's Auxiliary should actively participate in the program and that other efforts such as those of the Women's Field Army be utilized and directed along proper channels. He further recommends that there be a very careful selection of a committee definitely interested in cancer prevention and in a position to further considerably this effort. This committee should be extended to include at least one member from every councillor district.

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I wish to take this opportunity to thank the chairmen and members of the various sub-committees for their coöperation and urge the members of the South Dakota State Medical Association to seriously consider the recommendations and to take such action as they feel is necessary for putting these recommendations into effect.

D. S. Baughman, M.D., *General Chairman*,
Public Health Committee.

COUNCILOR'S REPORT — SECOND DISTRICT MEDICAL SOCIETY

During the past year this District has had its usual bimonthly meetings at each of which current business and scientific discussions were combined. Special activities of this District during the past year included immunization program in first grade of schools. These children were vaccinated against smallpox and given diphtheria immunization. Mantoux testing was done in the first, eighth and twelfth grades of the Watertown schools. The Society coöperated with the Red Cross in conducting and teaching numerous classes in first aid work throughout the year. Coöperation has extended likewise to the school system and the members have examined large numbers of students.

The financial condition of the Second District at the present time is excellent. This is due to the fact that immunization clinic fees received from the State Board of Health and other nominal fees for services rendered to the school board have been routinely signed over to the District Society for use.

January of this year, members of the Society were saddened by the death of Dr. Harry M. Freeburg and the retirement of Dr. A. Einar Johnson, both of whom were members of the medical profession in South Dakota for thirty or more years.

H. Russell Brown, M.D., *Councilor.*

COUNCILOR'S REPORT — MADISON DISTRICT NUMBER 3

The first meeting of the Third District was held at the Isaac Walton Clubhouse at Madison, South Dakota, July 11, 1941. This was a joint meeting with the Second District Dental Society. The ladies of the Dental and Medical Auxiliaries were also present. Major R. F. Sackett, State Medical Officer of the Selective Service, was the speaker and discussed the duties and responsibilities of the members of the medical and dental professions in regard to the selective service. Other guests present were Dr. Henderson, president, and Dr. Elman, secretary, of the State Dental Association; Dr. Hart, president, and Dr. Nessa, president-elect, of the State Medical Association, and Dr. Ong, medical officer of the Chicago, Milwaukee, St. Paul and Pacific Railroad, Metz Car. There were 60 present at this meeting.

The second meeting was held December 30, 1941, at the Dudley Hotel at Brookings. Thirty-one members, ladies, and guests were present and enjoyed a most interesting presentation of the history of anatomy illustrated by lantern slides and given by Dr. Sherley Miller, professor of anatomy, of the University of Minnesota. At this meeting the following officers were elected for 1942: President, J. A. Muggly, M.D.; vice-president, E. H. Grove, M.D.; secretary-treasurer, D. S. Baughman, M.D.; censors, G. H. Gulbrandsen, M.D.; E. S. Watson, M.D., and H. A. Miller; delegate, Geo. E. Whitson, M.D.; alternate delegate, Laurie E. Jordan, M.D.

On February 11, 1942, a meeting was held at Hotel General Beadle, Madison, South Dakota. Nineteen members and guests were present at the luncheon which was followed by two talks, the first by Dr. B. M. Hart, president of the State Medical Association, and the second by Mr. Karl Goldsmith, attorney, who talked on the legal aspects of the practice of the medical profession.

On the evening of March 29, 1942, the Ladies' Auxiliary invited the doctors of the Third District to the home of Dr. and Mrs. D. S. Baughman for a buffet supper. Following this the ladies put on a program honoring the doctors in commemoration of Doctors' Day. Dr. Neilssen and Mrs. Neilssen of Sioux Falls, president of the State Auxiliary, were special guests.

The District has 23 paid-up members and 3 honorary members. With all bills paid, including a contribution of $25.00 to the National Physicians' Committee for the Extension of Medical Care, the District is in good financial condition, having a balance of approximately $100.00 in the treasury.

D. S. BAUGHMAN, *Councilor.*
Secretary-Treasurer, Third District Medical Society.
May 1, 1942.

COUNCILOR'S REPORT — FOURTH DISTRICT MEDICAL SOCIETY

The Fourth District Medical Society had a very good year and is in excellent condition at present, financially solvent and with fourteen paid-up members.

We have three members in the Army service at present, who are recorded as members of the Society but who are not asked to pay dues. There are two doctors in the district who have not paid their dues for 1942.

We held two meetings during the past year, the first on September 26, 1941. There was a dinner at the St. Charles Hotel, followed by a business meeting which was taken up entirely with our arrangements for the Pierre District Medical Aid Association.

We met again on February 6, 1942, at St. Mary's Hospital, Pierre, for a clinical program at which a large number of cases were presented by members of the Staff—one a case of hypernephroma in a three year old child; several cases of severe burns treated with sulfa .... spray were reported. Also there was a talk on gall-bladder disease, the newer sulfanilamide compounds, and one on intracapsular cataract extraction.

Following the clinical meeting, there was a dinner, and a business session taken up largely with the management of the Pierre District Medical Aid Association. Officers for the coming year were elected as follows:

President, G. J. Van Heuvelen, M.D., Pierre; vice-president, E. H. Collins, Gettysburg; secretary-treasurer, M. M. Morrissey, M.D., Pierre; delegate, O. A. Kimble, Murdo.

The President appointed Dr. T. F. Riggs, Pierre, Dr. B. M. Hart, Onida, and Dr. O. A. Kimble, Murdo, as a Committee on Procurement and Assignment, to coöperate with the State Committee.

It was voted to proceed for another year with our present arrangement with the P.D.M.A.A., the only change being that hospitalization for normal obstetric cases would no longer be allowed.

Our main Society activity this past year has been the operation of the P.D.M.A.A., a detailed report of which is attached hereto.

Respectfully submitted,
C. E. ROBBINS, M.D., *Councilor.*

PIERRE DISTRICT MEDICAL AID ASSOCIATION

The JOURNAL-LANCET of July, 1941, published the information relative to the organization of the Pierre District Medical Aid Association, which began operation on April 1, 1941. However, to bring some of the important points up to date in our minds, we list the following:

1. The membership is $33 per family.
2. Only Standard borrowers of the FSA are eligible.
3. The plan is in the control of the physicians, who authorize all hospitalization, maternity home care, drugs and dentistry.
4. The physicians guarantee full payment of approved bills on an agreed fee schedule. Any necessary scale down due to limitation of monthly allocation of funds, is borne by the physicians.

The plan is now in its 14th month and a condensed financial statement for the first year is as follows:

Received from memberships (565 families)		$18,095.00
Expenditures:		
Medical bills	$8,101.34 (45%)	
Dental bills	620.00 (35%)	
Hospital and Maternity Home bills	7,765.35 (42.5%)	
Drug bills	699.56 (4%)	
Administrative expense	908.75 (5%)	
		$18,095.00

The highest percentage paid to the physicians during the year was 90% and the lowest was the final month of the year (March, 1942)—46%; an average of 66% for the year.

One important change in the contract with the membership has been made for the present year, namely: *Hospitalization in normal obstetrics* is not included in the benefits of membership.

Practically 100% of all obstetrical cases during the first year were hospitalized at an average cost to the Association of $35. Obstetrical cases totalled 130 for the year—23% of the total number of families—hence the approximate cost of hospitalization of obstetrical cases was around $4,500. Inasmuch as the scale-down accepted by the physicians was approximately $4,100—assuming that the incident of illness remains the same during the coming year—the physicians should receive an average of between 90% and 95% of the fee schedule.

Interestingly enough—during the first month of the present year (April, 1942)—the physicians were paid 100%.

Only one significant change was made in the schedule of medical fees at the beginning of the present year. The original fee schedule provided for payment of $3 for a physical examination and $1 for ordinary office or hospital calls. The present fee schedule permits a charge of $2 for first call in any illness. It is believed this will be more easily interpreted by the auditing committee and more fair to all physicians and in the aggregate will yield as much revenue for given services.

Some interesting statistics have been compiled and are submitted herewith:

No. Members in Family	Pct. Rec'd Services	Ave. per Family	No. of Families
Two	64%	$22.45	41
Three	76%	32.00	80
Four	87%	34.37	112
Five	83%	32.00	96
Six	87%	50.00	85
Seven	90%	44.66	63
Eight	78%	37.00	32
Nine	100%	62.20	19
Ten	92%	51.80	13
Eleven	100%	52.06	7
Twelve	100%	55.58	9
Thirteen	67%	46.50	3
Fourteen	100%	3.00	1

Services by counties are as follows:

	Member Families	Pct. Receiving Services	Ave. per Member Family
Bennett	3	100%	$87.41
Dewey	17	88%	25.11
Haakon	48	71%	30.00

Hughes	57	83%	38.00
Hyde	42	86%	49.10
Jackson-Washabaugh	41	93%	50.00
Jones	57	82%	33.20
Lyman	23	70%	33.10
Mellette	48	81%	40.00
Potter	72	90%	33.60
Stanley	53	75%	35.00
Sully	58	86%	37.50
Ziebach	43	91%	44.85

In continuing this plan in central South Dakota, it should be remembered that without the help of the Federal Agency in rehabilitating the farmer of this territory during the years of drouth and grasshoppers—our people would have been forced to leave the state or go on relief. Today, as a result of that rehabilitation, thousands of our farmers are rapidly regaining their earning power and former financial status. The physicians are coöperating in this rehabilitation from the standpoint of medical care—believing that they are doing their share and no more and also feeling that the future prosperity of our farm families is necessary to the future practice of medicine in this territory.

The plan of coöperative medical care is strictly limited to the low income group as FSA clients are eligible for membership only until and only for that period of time during which they are indebted to the FSA for money advanced.

Respectfully submitted,
Geo. Kienholz, Secretary,
Pierre District Medical Aid Association.

COUNCILOR'S REPORT — FIFTH DISTRICT MEDICAL SOCIETY

The Huron District Medical Society had a membership of 16 the past year.

Five meetings were held since the last state meeting at which various subjects of scientific interest were presented as well as many business matters in connection with the war effort.

At our February 11th meeting President Hart of the State Association met with us and delivered an address. At the same meeting Attorney Karl Goldsmith of Pierre, the attorney for the State Association, gave a talk on Malpractice Suits.

G. E. Burman, M.D., *Councilor.*

COUNCILOR'S REPORT — SEVENTH DISTRICT MEDICAL SOCIETY

President, E. S. Stenberg, M.D.; vice-president, O. C. Erickson, M.D.; secretary-treasurer, C. F. McDonald, M.D.; censors, C. E. Culver, G. E. Zimmerman, G. E. VanDemark; delegates, G. E. Zimmerman, L. G. Leraan, L. J. Pankow; alternates, G. S. Stevens, S. A. Donahoe, O. V. Opheim. Board of directors: Three officers, three delegates, three at large: P. R. Billingsley, M.D., R. Reagan, M.D., A. Hyden, M.D.

Registered Licensed Physicians in the district	66
Members in good standing April 1	53

Dr. H. R. Hummer has retired after ten years as a most efficient secretary and treasurer. Dr. Hummer also has served most faithfully and professionally as the official reader of the radio broadcasts conducted weekly by the State Medical Association. He has well earned his place among our honorary membership.

The Board of Directors confer prior to each meeting to consider all business and in turn report and make recommendations to the membership in open meetings.

Attendance at meetings is from 15 to 45 with from 6 to 12 physicians attending from neighbor districts and nearby Minnesota. Interested physicians are kept on the mailing list and sent announcement of all programs. The dues of the Society are $15.00 annually.

The medical staffs of McKennan and Sioux Valley hospitals contain most of the membership of the Society, and they hold regular monthly meetings, thereby affording to the physicians of this district three scientific meetings each month.

The Society also endorses the annual clinic of the McKennan hospital staff in which practically all physicians participate and having an attendance last November of 85.

The Society has always done its part when called upon in state and local duties, has carried more than its share of burden during these long years of relief and suffice it now to say that in these trying days of the Nation at war, stand ready to act wherein and wherever called upon in matters of defense in its successful execution and conclusion.

Will E. Donahoe, M.D., *Councilor.*

May 13, 1942.

COUNCILOR'S REPORT — EIGHTH DISTRICT MEDICAL SOCIETY

The officers of the eighth district of the South Dakota State Medical Association are: President, Dr. F. J. Abts, Yankton; vice-president, Dr. E. Joyce, Hurley; secretary and treasurer, Dr. J. A. Hohf, Yankton; delegates, Drs. Abts and Joyce; alternates, Dr. A. P. Redding and Dr. F. W. Haas; censors, Drs. E. M. Stansbury, Geo. E. Johnson and S. M. Hohf.

There are 54 practicing physicians in this district who are eligible to membership. Of these, 34 are registered as members of the association. Twenty-nine of these have paid 1942 dues as of April 24, 1942. Five were delinquent on that date.

There are three honorary members and three associate members. Twenty eligible practitioners in the eighth district are not members of the association. Five non-eligible physicians are practicing at the State Hospital at Yankton.

Four regular members are in the military service and are carried without payment of dues except one, who paid his dues before entering such service.

Medical meetings are held quarterly except that the summer meeting is cancelled because of the state meeting.

The fall meeting assembles at the State Hospital at Yankton, and the doctors and their wives are guests of Dr. and Mrs. G. S. Adams. A wonderful banquet is served after which outside speakers of prominence are heard on a scientific program, which is followed by a business meeting. Following the banquet the wives of the doctors meet with the auxiliary and enjoy various sorts of entertainment.

The winter meeting takes place in Yankton. Here the program is always good consisting of outside speakers and general discussion followed by a business session.

The spring meeting is at Vermillion and is held in the chemistry building at the University of South Dakota. Preceding the meeting the ladies of the Congregational church serve a fine supper where each person pays his share; after which the ladies' auxiliary meets. Outside speakers are heard at this meeting and all in attendance agree that the subjects are presented in a wonderfully fine manner.

General attendance at these meetings will average about fifty per cent of membership.

In 1941 dues collected amounted to $428.00. Expenses were $392.21. The total balance in the treasury on January 1, 1942, was $645.47, of which $500.00 is invested in defense bonds.

E. M. Stansbury, M.D., *Councilor.*

COUNCILOR'S REPORT — TENTH DISTRICT MEDICAL SOCIETY

It is with some hesitation I attempt an annual report for District No. 10. Due to the large area and few doctors here it is difficult to inaugurate outside activities. There are two doctors not members of Medical Associations, one in the extreme southeast corner, and the other in the extreme northwest who is possibly affiliated with the Pierre District. We claim 80 per cent membership.

R. V. Overton, M.D., *Councilor.*

COUNCILOR'S REPORT — ELEVENTH DISTRICT MEDICAL SOCIETY

I hereby submit the annual report of the Eleventh District Medical Society. There have been only two general meetings of the district society during the year but these were well attended considering the small membership in the society. Scientific papers were presented, followed by interesting discussions. At the second meeting, officers for the coming year were elected. These were: Dr. J. E. Curtis, Lemmon, president; Dr. W. A. George, Selby, vice-president; Dr. C. E. Duncan, Pollock, secretary-treasurer; Dr. F. C. Totten, Lemmon, delegate.

During the year our society suffered a severe loss in the death of Dr. C. L. Olson, McIntosh, who died in Minneapolis in June 1941 while doing postgraduate work in Minneapolis. Death came suddenly following a heart attack. As has been the case where death has occurred in an unopposed small town medical practice in this district, his place has been filled by an osteopath.

Three Medical Reserve Officers were called during the year to active Army duty: Drs. R. M. Catey, A. W. Spiry and L. D. Harris. Of these, Drs. Spiry and Harris were disqualified for physical defects and returned to Mobridge to resume practice. There are at present only nine physicians residing in this district, all of whom are members of this society. In addition, Dr. James G. Sawyer who formerly resided here but who is at present with the Veterans Administration, retains his membership in our society.

C. E. LOWE, M.D., *Councilor.*

COUNCILOR'S REPORT — TWELFTH DISTRICT MEDICAL SOCIETY

During the past year there have been three meetings of the Twelfth or Whetstone Valley District Medical Society.

One meeting was held in October, 1941, at the Milbank Country Club. The scientific program was presented by Drs. Stevens, Cercle and Nessa of Sioux Falls.

In February, 1942, there was another meeting at Milbank which was combined with the annual staff meeting of St. Bernard's Providence Hospital. The following officers were elected at that meeting:

T. A. Hedemark, M.D., Revillo, president; F. N. Cliff, M.D., Milbank, vice-president; D. A. Gregory, M.D., Milbank, secretary-treasurer; D. A. Gregory, M.D., Milbank, delegate.

In March, 1942, a meeting was held at Webster which was attended by our state president, Dr. B. M. Hart of Onida. After a short business session Dr. Hart addressed the society.

The Medical Preparedness Committee for the Twelfth District was converted into the Procurement and Assignment Service Committee and the committee is comprised of the following members: P. D. Peabody, Sr., M.D., Webster; F. N. Cliff, M.D., Milbank; A. W. Pearson, M.D., Sisseton.

WM. DUNCAN, M.D., *Councilor.*

ADDRESS OF THE PRESIDENT

B. M. Hart, M.D.

Onida, South Dakota

My term as your President of the South Dakota State Medical Association is about closed. I will attempt to give the records of my stewardship and my best effort for its prosperity and success of the society. I have tried in my humble way to give the best possible for all its members and its advancement; I have visited all the twelve districts of the state; I have driven 5481 miles by auto. I made one trip to Minneapolis where I enjoyed the meeting of the Minnesota State Medical Association and got a lot of very good ideas and suggestions.

I made a trip to Chicago, January 12, 1942, by request of the American Medical Association, to attend a meeting of the Fourth Annual Congress of Industrial Health. I obtained much valuable information from this meeting by listening to a large group of noted men who gave reports and addresses on various subjects pertaining to the welfare of Industrial Health of our country. I would advise all physicians to read the proceedings of this meeting, of which many papers are in the *Journal of the American Medical Association*, January 14, 1942. Many of the doctors, who attended this meeting by invitation, visited the Carnegie Illinois Steel Corporation of Gary, Indiana. This is one of the largest in the country, over 30,000 employees. We visited the hospital, clinics, saw demonstration in real action. We toured the plant and saw the surgical rooms, dental department, physical therapy, X-rays, demonstrations, discussions and moving pictures of burns and fractures and witnessed demonstrations of safety devices, of resuscitation and heat exhaustion and diet regulations, etc.

We have been mobilizing our country for war. Billions of dollars are spent for training our soldiers, manufacturing armaments, ships, airplanes and tanks. We are in this war to win it. Also to win the peace and save Democracy for all liberty loving nations. We have a duty to perform, not only to our armed forces but to our civilian population. Are we prepared to handle our medical program? To combat the needs surgically, medically, socially and psychologically. Let us look at the records for a few moments.

April 1, 1941. The American Medical Association sent out 180,000 questionnaires, 150,407 were returned. In the selective service up to February 1, 1942, twenty-eight thousand physicians were enrolled in various phases of the work of the Selective Service System.

In nearly every community, large or small, the medical men are doing a grand piece of work for the government. At a meeting of the secretaries and editors of the state medical societies Brig. Gen. Lewis B. Hershey, director of the Selective Service System, expressed the appreciation of the Selective Service for the coöperation of the medical profession.

He said, "I do not possess control of the English language adequate to tell you what the work of anywhere from twenty to fifty thousand of the medical profession of America has done in the last year in the Selective Service. I do believe you occupy a peculiar position in the minds of the people. You still do have some of that combination that came from long ago, when the medicine man was something a little more than a human being."

In the late enrollment blank recently sent out to the various doctors for Procurement and Assignment service, more than 25,000 physicians indicated that, when notified, they would apply at once for commission. Many of these physicians have already gone into service and some are on the fighting lines.

We must give credit to many of the officers of the American Medical Association for they have done a great piece of work for the government agencies in connection with the war effort in organizing and recording systematically nearly every doctor in America. In their system they have a complete record of each doctor, name, age, qualification, family, specialties, etc. No other organization could furnish such data in a short time of a few hours.

For your information: There are in the United States and her possessions about 180,000 physicians and 130,000,000 people, 6358 registered hospitals, 732 approved for interns, 174 technical schools and 65 four year medical schools. There are 1,324,381 hospital beds, with an increase of about 30,000 per year, but this last year has increased to 98,136 beds preparing for war casualties.

The number of patients admitted 11,596,188 — 10,646,947 were to general hospitals. There were 1,404,940 births in hospitals. The rate of increase in hospital births was double that of the previous year. Just a few years ago the ratio would be reversed. The technical personnel employed in all hospitals, 9609 full time laboratory technicians, 5534 full time X-ray technicians, also included in this list are dietitians, physical therapists, pharmacists, psychiatrists, medical record librarians, stenographers, therapists, dental hygienists and various social workers.

There were 5,201,650 patients operated upon or 49.9 per cent of patients admitted, necropsies on 125,640, or 24.6 per cent of total deaths. These are American Medical Association reports. From these records anyone can see the tremendous responsibilitiy of the physicians who remain at home to do the work. And I would like to say right here and now that we who cannot go to the battle front should faithfully resolve that we will do our part to care for these patients, to our utmost capacity and fully resolve to return every patient, so treated, back to the men who are fighting our battles on the war front. They are sacrificing many times more than we and taking a lot more punishment and danger with much less remuneration and credit.

There should be no lowering of the standards of our medical education, hospitals or practice during this war. It has been a long hard struggle to get it up to this standard. Let us keep the standard even if we must work a little harder and longer hours. We have given our services freely and honorably. We have asked deferment only where it would be a hardship to a community, a school or an industry or where it would be indispensable for the National Defense Program.

Our National Defense Program requires more than procuring and assignment of physicians and surgeons and other allied groups. It must train 60,000 men and women in the medical department, several hundred for the Public Health Service and many other activities in the war field.

The great dangers of war to our people are not the loss by bullets and gunfire, but from disease, both physical and mental, in the war zones and at home. Also in national industrial deficiencies which wreck the courage and will of the soldiers and the civilians alike.

We must keep up the fighting spirit at home as well as on the war front if we are going to accomplish the best results and save democracy. We should do this job with a smile and a song on our lips and wherever possible lead others to do the same. Let us not lose that happy morale of the American way of doing things. Soon we will be facing the aftermath of a long hard war filled with all its hardships and tragedies that come with such a catastrophe. Will we be prepared to meet it?

Summary of Things Hoped For

Some things we should learn and know to make the medical profession sound and progressive.

1. The platform of the American Medical Association, what it means to the future of the medical profession.

2. The Priceless Heritage. The things we have done for the people. To save, prolong and protect our civilization.

3. We should present a clear and convincing picture of our medical problems and activities to the general public.

4. We should have coöperation, not opposition, between medical men in all branches, social, economical, political and scientific.

5. Coöperation of medical men and the allied groups —pharmacy, dentistry, veterinary, nurses and hospitals.

6. We should demand a democratic system for all the people; no segregation, special privileges or class association should be tolerated.

7. We, as qualified physicians, should be the leaders in applying the science and the art of medicine to the people, whom we serve in our field of work. No organization, governmental or social, can rightfully take this prerogative from us.

8. We should strive to be alert to all medical advancement in scientific achievement, in mechanical development, in legislation enactments that would be of benefit to the patient and the medical profession.

9. The Woman's Auxiliary should be encouraged and assisted in every possible manner, for where there are numbers there lies the strength and especially so in the field of accomplishment and service.

10. The early active work of all the elective officers, councilors, and delegates for a better medical organization. Unity, not discord, should be our motto.

11. The coöperation of all committees, standing and special, which have been appointed by your medical officers. These committees are the backbone of our medical society. The chairman of each committee should take early active part, with the other members of the com-

mittee and formulate and promote your special desires and requirements for the success in your fields of service.

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We are standing today on a threshold of a changing humanity.

We must not look out onto a world through a glass whose back is covered with mercury.

Right and wrong are not considered in the war we are fighting. It is only might which will conquer the world in the enemy view point.

We must put forth our best efforts to develop the most good to the greatest number of people, if we are to gain the confidence and support of our fellow men.

And finally again I wish to thank those officers who have served so faithfully with me and helped so much to make the year a pleasant one. I wish also to thank the district societies who were so kind to arrange meetings and make it pleasant with good programs.

Let our motto be for our State Medical Association, "we are small but let us make it good."

ADDRESS OF THE PRESIDENT-ELECT*

N. J. Nessa, M.D.

Sioux Falls, South Dakota

Officers, Councillors, Delegates, and members of the South Dakota State Medical Association: I am not unmindful of my limitations as I am about to enter upon and discharge the duties as president of this Association; but I hasten to voice my thanks and appreciation for the great honor you have conferred upon me and with your counsel and friendly coöperation I shall attempt to fulfill my duties to the best of my ability.

May I also at this time congratulate our outgoing president for the fine work he has performed during his incumbency; and my ambition is to be able to accomplish in part what he has so loyally performed during the past year.

The year ahead is likely beset with great changes and difficulties in our profession, I dare say much greater than ever before in the history of organized medicine. The present World War II may stifle civilization and I possess insufficient prophetic ability and acumen to even hint at what the outcome will be, but I do have my misgivings and really wonder at times if 1943 will allow us to gather and function as we do here this day.

We have all only recently filled out the government blanks for procurement and assignment for medical service in the United States Army as authorized by President Roosevelt on October 30, 1941, and are consequently duly rostered and classified at headquarters in Washington. Members of our profession throughout the nation are being called to duty as rapidly as they can be secured and day by day the home guard is being depleted more and more so that sooner or later civilian medical service must of necessity become arduous and complicated.

A recent article in the *Journal of the American Medical Association* states that 5000 physicians are needed at once and that 11,000 additional will be needed by the end of this year and what the quota will be for 1943 and later if the war lasts, is conjectural; but at least the issue is a very serious one and I have particular reference to CIVILIAN MEDICAL DEFENSE. The proportion of physicians in the army service compared to the number in civilian practice is roughly eight to one, if I am correctly informed with the disproportion in the army's favor. This disparity will of necessity bring great additional professional burden on the older members who will be obliged to assume and carry the medical practices left by the inducted physicians and one cannot help but anticipate that cultism will thereby gain a covetous and valuable leverage towards a gainful and lucrative practice.

I believe that our economic condition is definitely on the up grade in our state where increasing agricultural factors of moisture and prices are surely improving and encouraging, and will prove a welcome circumstance to many of our members who have been obliged to battle for years with economic advertsity caused by drought and associated dilemmas. The laws of nature give us change and motion in all things and therefore it is true that prosperity follows depression like day follows night, so if we are now entering an early cycle of favorable periodical change, it is hoped that we may be permitted to continue the practice of medicine as a free enterprise without political hindrance or regulations.

Advancing tax schedules will of necessity lower our annual income the same as if we were engaged in other business or commercial pursuits; but the doctor as usual will be found not wanting but willing and agreeable to contribute his share to help win this war and save democracy.

Medicine is ever on the march of progress and we have witnessed great advancement in the medical sciences, as it is within the last few years that we have added chemotherapy by use of the Sulfa drugs and quite recently the use of dry blood plasma, either one of which will save millions of lives in time to come.

We are all engaged in highly worth while achievements and our Association has definite purposes and ideals which require coöperation and diligent attention if we are to serve humanity with ability and distinction.

We hope that world peace will soon again prevail and that the physician of tomorrow will benefit from our trials and tribulations and that we may be granted meritorious credit, which we hope will be deserved.

Our meeting this year is the second one of an interallied nature, the first being held here in Sioux Falls in 1936, and I wish to thank and congratulate the various committees for their ardent and conscientious work necessary to formulate and arrange a program with its necessary associated activities. As your incoming president and resident of this city, I welcome you all in behalf of our Seventh District Medical society and hope your visit will prove highly enjoyable and profitable.

I thank you.

SOUTH DAKOTA STATE MEDICAL ASSOCIATION ROSTER--1942

Membership by Districts

ABERDEEN DISTRICT No. 1

Calene, J. L.	Aberdeen
PRESIDENT	
F. H. Cooley	Aberdeen
SECRETARY	
†I. L. Schuchardt	Aberdeen
Adams, J. F.	Aberdeen
Aldrich, H. H.	Wessington
Alway, J. D.	Aberdeen
*Bates, W. A.	Aberdeen
Brenckle, J. F.	Mellette
Bruner, J. E.	Aberdeen
Bunker, Paul	Aberdeen
Cook, J. F. D.	Pierre
Cooley, F. H.	Aberdeen
Damm, W. P.	Redfield
Drissen, E. M.	Britton
Eckrich, J. A.	Aberdeen
*Elward, L. R.	Doland
Farrell, W. D.	Aberdeen
*Freyberg, F. W.	Conde
Graff, L. W.	Britton
Keegan, Agnes	Aberdeen
King, H. I.	Aberdeen
King, Owen	Aberdeen
Kositzky, A.	Leola
Krugich, S. J.	Aberdeen
Mayer, R. G.	Aberdeen
Murdy, B. C.	Aberdeen
Pittenger, E. A.	Aberdeen
Ranney, T. P.	Aberdeen
Rice, D. B.	Britton
Rudolph, E. A.	Aberdeen
Scallin, P. R.	Redfield
Weishaar, Chas.	Aberdeen
White, W. E.	Ipswich
Whiteside, J. D.	Aberdeen

WATERTOWN DISTRICT No. 2

PRESIDENT	
R. M. Kilgard	Watertown
SECRETARY	
M. W. Larsen	Watertown
Bartron, H. J.	Watertown
Bates, J. S.	Watertown
Brown, H. R.	Watertown
Cooper, George	Watertown
*Hammond, M. J.	Watertown
Jorgenson, M. C.	Watertown
Kenney, H. T.	Watertown
Kilgaard, R. M.	Watertown
Larsen, M. W.	Watertown
Lockwood, J. H.	Henry
Magee, W. G.	Watertown
Maxwell, R. T.	Clear Lake
McIntyre, P. S.	Bradley
Randall, O. S.	Watertown
Richards, Geo.	Watertown
Rousseau, M. C.	Watertown
Sherwood, H. W.	Doland
Vaughn, J. B.	Castlewood
Walters, S. J.	Watertown
Willen, Abner	Clark

MADISON DISTRICT No. 3

PRESIDENT	
J. A. Muggly	Madison
SECRETARY	
D. S. Baughman	Madison
Baughman, D. S.	Madison
†Boyd, F. E.	Flandreau
Davidson, Magni	Brookings
Drobinsky, Miguel	Estelline
*Engleson, C. J.	Brookings
Grove, E. H.	Arlington
Gulbrandsen, G. H.	Brookings
Hopkins, N. K.	Arlington
Jordan, L. E.	Chester
Kershner, C. M.	Brookings
Madsen, Mars L.	Canova
Miller, H. A.	Brookings
Mokler, V. A.	Wentworth
Muggly, J. A.	Madison
Peeke, A. P.	Volga
Sherwood, C. E.	Madison
Tank, M. C.	Brookings
Tillisch, H.	Brookings
*Torwick, E. E.	Volga
Torwick, E. T.	Volga
Watson, E. S.	Brookings
Westaby, R. S.	Madison
Westaby, J. R.	Madison
Whitson, G. E.	Madison
Willoughby, F. C.	Howard

PIERRE DISTRICT No. 4

PRESIDENT	
G. J. Van Heuvelen	Pierre
SECRETARY	
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Collins, E. H.	Gettysburg
Creamer, F. H.	Dupree
Cowan	Pierre
Embree, V. W.	Onida
Hart, B. M.	Onida
Kimble, O. A.	Murdo
Martin, H. B.	Harrold
Morrissey, M. M.	Pierre
Murphy, Joseph	Murdo
Northrup, F. A.	Pierre
Riggs, T. F.	Pierre
Robbins, C. E.	Pierre
Schultz, S.	Pierre
Triolo, A.	Pierre
Van Heuvelen, G. J.	Pierre

HURON DISTRICT No. 5

PRESIDENT	
B. T. Lenz	Huron
SECRETARY	
R. A. Buchanan	Huron
Adams, H. P.	Huron
Buchanan, R. A.	Huron
Burman, G. E.	Carthage
Christianson, A. H.	Clark
Class, F. L.	Huron
*Grosvenor, L. N.	Huron
Hagin, J. C.	Miller
Lenz, B. T.	Huron
Pangburn, M. W.	Miller
Saxton, W. H.	Huron
Saylor, H. L.	Huron
Sewell, H. D.	Huron
Shirley, J. C.	Huron
Tschetter, J. S.	Huron
Wright, O. R.	Huron

MITCHELL DISTRICT No. 6

PRESIDENT

L. W. Tobin — Mitchell

SECRETARY

R. A. Weber — Mitchell

Alcott, F. B.	Chamberlain
Auld, C. V.	Plankington
Ball, W. R.	Mitchell
Beukleman, W. H.	Stickney
Bobb, C. S.	Mitchell
Bobb, B. A.	Mitchell
Bollinger, Wm. F.	Parkston
DeVries, A.	Platte
Delaney, Wm. A.	Mitchell
Dick, L. C.	Spencer
Fritz, W. H., Jr.	Mitchell
Gifford, A. J.	Alexandria
Gillis, F. D.	Mitchell
Hoyne, A. H.	Salem
Jones, E. W.	Mitchell
Jones, T. D.	Chamberlain
Lloyd, J. H.	Mitchell
McGreevy, J. V.	Mitchell
Mabee, D. R.	Mitchell
Mabee, O. J.	Mitchell
Maytum, W. J.	Alexandria
Reib, W. G.	Parkston
Stegeman, S. B.	Salem
Tobin, F. J.	Mitchell
†Tobin, L. W.	Mitchell
Weber, R. A.	Mitchell
Young, E. M.	Mitchell

SIOUX FALLS DISTRICT No. 7

PRESIDENT

E. S. Stenberg — Sioux Falls

SECRETARY

C. J. McDonald — Sioux Falls

Billingsley, P. R.	Sioux Falls
Billion, T. J.	Sioux Falls
Carney, Myrtle S.	Sioux Falls
Clark, J. C.	Sioux Falls
Cottam, G. I. W.	Sioux Falls
*Cottam, Gilbert	Sioux Falls
*Craig, D. W.	Sioux Falls
*Culver, C. F.	Sioux Falls
Dehli, H. M.	Colton
DeVall, F. C.	Garretson
Donahoe, W. E.	Sioux Falls
Donahoe, S. A.	Sioux Falls
Dulaney, C. H.	Canton
Eagan, J. B.	Dell Rapids
Erickson, O. C.	Sioux Falls
Erickson, E. G.	Sioux Falls
Fisk, R. R.	Flandreau
Gage, E. E.	Sioux Falls
Gregg, J. B.	Sioux Falls
Groebner, O. A.	Sioux Falls
Grove, A. F.	Dell Rapids
Hanson, O. L.	Valley Springs
Hummer, H. R.	Sioux Falls
Hofer, E. J.	Freeman
Hyden, Anton	Sioux Falls
Keller, S. A.	Sioux Falls
Kemper, C. E.	Viborg
Kittleson, J. A.	Sioux Falls
Lamb-Barger, H. H.	Sioux Falls
Lanam, M. O.	Sioux Falls
Leraan, L. G.	Sioux Falls
McDonald, C. J.	Sioux Falls
Mullen, R. W.	Sioux Falls
Nelson, J. A.	Sioux Falls
Nessa, N. J.	Sioux Falls
Nietfeld, A.	Sioux Falls
Nilsson, F. C.	Sioux Falls
Opheim, O. V.	Sioux Falls
Pankow, L. J.	Sioux Falls
Parke, L. L.	Canton
*Posthuma, Anne	Sioux Falls
Reagan, Resin	Sioux Falls
*Roberts, W. P.	Sioux Falls
Sercl, W. F.	Sioux Falls
Stenberg, E. S.	Sioux Falls
Stevens, R. G.	Sioux Falls
Stevens, G. A.	Sioux Falls
Stone, J. G.	Montrose
Van Demark, G. E.	Sioux Falls
Volin, H. P.	Lennox
Zimmerman, Goldie	Sioux Falls

YANKTON DISTRICT No. 8

PRESIDENT

E. Joyce — Hurley

SECRETARY

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Abts, F. J.	Yankton
Adams, G. S.	Yankton
Blezek, F. M.	Tabor
Brookman, L. J.	Vermillion
Bushnell, Wm. F.	Elk Point
Bury, Chas. F.	Geddes
Conner, E. I.	Alcester
*Cruickshank, Thos.	Vermillion
Duggan, T. A.	Wagner
Fairbanks, W. H.	Vermillion
Freshour, Ina Moore	Yankton
Greenfield, J. C.	Avon
Giedt, W. R.	Vermillion
Haas, F. W.	Yankton
Hohf, S. M.	Yankton
Hohf, J. A.	Yankton
Hubner, R. F.	Yankton
Johnson, Geo. E.	Yankton
Joyce, E.	Hurley
*Kalayjian, D. S.	Parker
Kauffman, E. J.	Marion
*Keeling, C. M.	Springfield
Lacey, V. I.	Yankton
Landmann, G. A.	Scotland
Leonard, B. B.	Yankton
Lietzke, E. T.	Beresford
Malloy, J. F.	Yankton
Morehouse, E. M.	Yankton
Murphy, J. C.	Yankton
Ohlmacher, J. C.	Vermillion
Reding, A. P.	Marion
Schwartz, E. R.	Wakonda
Smith, A. J.	Yankton
Stansbury, E. M.	Vermillion
Stuckart, Theo.	Platte
Willhite, F. V.	Redfield
Wynegar, D. E.	Chattahoochee, Fla.

BLACK HILLS DISTRICT No. 9

PRESIDENT

D. L. Kegaries — Rapid City

SECRETARY

J. D. Bailey — Rapid City

Allen, A. G.	Denver, Col.
Bailey, J. D.	Rapid City
Bailey, S. G.	Hot Springs
Bestgen, Fred P.	Rapid City
Bilger, F. W.	Hot Springs
Butler, J. M.	Hot Springs
Clark, O. H.	Newell
Crane, H. L.	L'Orya, Peru
Davis, J. H.	Belle Fourche
Dawley, W. A.	Rapid City
Doyle, J. I.	Rapid City
Ewald, P. P.	Lead
Fleeger, R. B.	Lead
Fuchlow, J. R.	Rapid City
Hare, Lyle	Spearfish
Heilesen, W. E.	Custer
Howe, F. S.	Deadwood
Hummer, F. L.	Lead
Jackson, A. S.	Lead
Jackson, R. J.	Rapid City
Jernstrom, R. E.	Rapid City
Kegaries, D. L.	Rapid City
*Knoll, W.	Hot Springs
Lemley, R. E.	Rapid City
†Lampert, A. A.	Rapid City
Manning, F. E.	Custer
McKie, John F.	Sturgis
Mattox, N. E.	Lead
Meyer, W. L.	Sanator
Mihran, M. K.	Rapid City
Mills, G. W.	Wall
Minty, F. W.	Rapid City
Morse, W. E.	Rapid City
Morsman, C. F.	Hot Springs
Newby, H. D.	Rapid City
O'Toole, T. F.	New Underwood
Pemberton, M. O.	Deadwood
Ramsey, Guy	Bluebell
Richards, F. A.	Sturgis
Sherman, K. E.	Sturgis
†Smiley, J. C.	Deadwood
Soe, Carl A.	Lead
Spain, M. L.	Hot Springs
*Stewart, J. L.	Spearfish
Stewart, N. W.	Lead
Swift, Chas.	Martin
Sundet, N. J.	Kadoka
Threadgold, J. O.	Belle Fourche
†Zarbaugh, Guy F.	Deadwood

ROSEBUD DISTRICT No. 10

PRESIDENT	
A. O. Carmack	Colome
SECRETARY	
R. V. Overton	Winner
Carmack, A. O.	Colome
Lande, L. E.	Winner
Malster, R. M.	Carter
Mannion, J. E.	Gregory
Overton, R. V.	Winner
Quinn, R. J.	Burke
Studenburg, J. E.	Gregory
Wilson, F. D.	Winner

NORTHWEST DISTRICT No. 11

PRESIDENT	
J. E. Curtis	Lemmon
SECRETARY	
C. E. Duncan	Pollock
Curtis, J. E.	Lemmon
Christie, Roy E.	Eureka
Duncan, C. E.	Pollock
George, W. A.	Selby
Harris, L. D.	Mobridge
Lima, Frank	Mobridge
Lowe, C. E.	Mobridge
Sawyer, J. G.	Mobridge
Spirey, A. W.	Mobridge
Totten, F. C.	Lemmon

WHETSTONE VALLEY DISTRICT No. 12

PRESIDENT	
T. A. Hedemark	Revillo
SECRETARY	
D. A. Gregory	Milbank
Cliff, F. N.	Milbank
Duncan, Wm.	Webster
Flett, Chas.	Milbank
Gregory, D. A.	Milbank
Hawkins, A. P.	Waubay
Hayes, Clara E.	Washington, D. C.
Hedemark, T. A.	Revillo
Jacotel, J. A.	Milbank
Judge, W. T.	Milbank
Karlins, W. H.	Webster
Murphy, T. W.	Bristol
Peabody, P. D., Sr.	Webster
Peabody, P. D., Jr.	Webster
Pfister, Faris	Webster
Porter, O. M.	Sisseton

** Honorary or Affiliate Member.*
†Armed Forces, U. S.

ROSTER
South Dakota State Medical Association--1942

Allen, A. G.	Denver, Col.
Abts, F. J.	Yankton
Adams, G. S.	Yankton
Adams, H. P.	Huron
Adams, J. F.	Aberdeen
Alcott, F. B.	Chamberlain
Aldrich, H. H.	Wessington
Allen, A. G.	Denver, Colo.
Alway, J. D.	Aberdeen
Auld, C. V.	Plankington
Bailey, J. D.	Rapid City
Bailey, S. G.	Hot Springs
Ball, W. R.	Mitchell
Bartron, H. J.	Watertown
Bates, J. S.	Watertown
*Bates, W. A.	Aberdeen
Baughman, D. S.	Madison
Bestgen, Fred P.	Rapid City
Bilger, F. W.	Hot Springs
Billingsley, P. R.	Sioux Falls
Billion, T. J.	Sioux Falls
Blezek, F. M.	Tabor
Bobb, B. A.	Mitchell
Bobb, C. S.	Mitchell
Bollinger, W. F.	Parkston
Boyd, F. E.	Flandreau
Brenckle, J. F.	Mellette
Brookman, L. J.	Vermillion
Brown, H. R.	Watertown
Bruner, J. E.	Aberdeen
Buchanan, R. A.	Huron
Bunker, Paul	Aberdeen
Buekelman, W. H.	Stickney
Bury, Chas. F.	Geddes
Burman, G. E.	Carthage
Bushnell, W. F.	Elk Point
Butler, J. M.	Hot Springs
Calene, J. L.	Aberdeen
Carmack, A. O.	Colome
Carney, Myrtle S.	Sioux Falls
Christensen, A. H.	Clark
Christie, Roy	Eureka
Clark, J. C.	Sioux Falls
Clark, O. H.	Newell
Class, F. L.	Huron
Cliff, F. N.	Milbank
Collins, E. H.	Gettysburg
Conner, E. I.	Alcester
Cook, J. F. D.	Pierre
Cooley, F. H.	Aberdeen
Cooper, George	Watertown
Cottam, G. I. W.	Sioux Falls
Cowan	Pierre
*Cottam, Gilbert	Sioux Falls
*Craig, D. W.	Sioux Falls
Crane, H. L.	L'Orya, Peru
Creamer, F. H.	Dupree
*Cruickshank, Thos.	Vermillion
*Culver, C. F.	Sioux Falls
Curtis, J. E.	Lemmon
Damm, W. P.	Redfield
Davidson, Magni	Brookings
Davis, J. H.	Belle Fourche
Dawley, W. A.	Rapid City
Dehli, H. M.	Colton
Delaney, Wm. A.	Mitchell
DeVall, F. C.	Garretson
Dick, L. C.	Spencer
DeVries, A.	Platte
Donahoe, S. A.	Sioux Falls
Donahoe, W. E.	Sioux Falls
Doyle, Jas. I.	Rapid City
Drissen, E. M.	Britton
Drobinsky, Miguel	Estelline
Duggan, Thos. A.	Wagner
Dulaney, C. H.	Canton
Duncan, Wm.	Webster
Duncan, C. E.	Pollock
Eagan, J. B.	Dell Rapids
Eckrich, J. A.	Aberdeen
Embree, V. W.	Onida
*Engelson, C. J.	Brookings
Erickson, E. G.	Sioux Falls
Erickson, O. C.	Sioux Falls
Ewald, P. P.	Lead
Fairbanks, W. H.	Vermillion
Farrell, W. D.	Aberdeen
Fisk, R. R.	Flandreau
Fleeger, R. B.	Lead
Flett, Chas.	Milbank
Freshour, Ina Moore	Yankton
Fritz, W. H., Jr.	Mitchell
Fuchlow, J. R.	Rapid City
Gage, E. E.	Sioux Falls
George, W. A.	Selby
Giedt, W. R.	Vermillion
Gifford, A. J.	Alexandria
Gillis, F. D.	Mitchell
Graff, L. W.	Britton

Greenfield, J. C.	Avon
Gregg, J. B.	Sioux Falls
Gregory, D. A.	Milbank
Groebner, O. A.	Sioux Falls
*Grosvenor, L. N.	Huron
Grove, A. F.	Dell Rapids
Grove, E. H.	Arlington
Guldbrandson, G. H.	Brookings
Haas, F. W.	Yankton
Hagin, J. C.	Miller
*Hammond, M. J.	Watertown
Hanson, O. L.	Valley Springs
Hare, Lyle	Spearfish
Harris, L. D.	Mobridge
Hart, B. M.	Onida
Hawkins, A. P.	Waubay
Hayes, Clara E.	Washington, D. C.
Hedemark, T. A.	Revillo
Heilesen, W. E.	Custer
Hofer, E. J.	Freeman
Hohf, J. A.	Yankton
Hohf, S. M.	Yankton
Hopkins, N. K.	Arlington
Howe, F. S.	Deadwood
Hoyne, A. H.	Salem
Hubner, R. F.	Yankton
Hummer, F. L.	Lead
Hummer, H. R.	Sioux Falls
Hyden, Anton	Sioux Falls
Jackson, A. S.	Lead
Jackson, R. J.	Rapid City
Jacotel, J. A.	Milbank
Jernstrom, R. E.	Rapid City
Johnson, G. E.	Yankton
Jones, E. W.	Mitchell
Jones, T. D.	Chamberlain
Jordan, L. E.	Chester
Jorgenson, M. C.	Watertown
Joyce, E.	Hurley
Judge, W. T.	Milbank
*Kalayjian, D. S.	Parker
Karlins, W. H.	Webster
Kauffman, E. J.	Marion
Keegan, Agnes M.	Aberdeen
*Keeling, C. M.	Springfield
Kegaries, D. L.	Rapid City
Keller, S. A.	Sioux Falls
Kemper, C. E.	Viborg
Kenney, H. T.	Watertown
Kershner, C. M.	Brookings
Kilgard, R. M.	Watertown
Kimble, O. A.	Murdo
King, H. I.	Aberdeen
King, Owen	Aberdeen
Kittelson, J. A.	Sioux Falls
*Knoll, W.	Hot Springs
Kositzky, A.	Leola
Krugich, S. J.	Aberdeen
Lacey, V. I.	Yankton
Lamb-Barger, Hazel	Sioux Falls
Lampert, A. A.	Rapid City
Lanam, M. O.	Sioux Falls
Lande, L. E.	Winner
Landmann, G. A.	Scotland
Larsen, M. W.	Watertown
Lemley, R. E.	Rapid City
Lenz, B. T.	Huron
Leonard, B. B.	Yankton
Leraan, L. G.	Sioux Falls
Lietzke, E. T.	Beresford
Lima, Frank	Mobridge
Lloyd, J. H.	Mitchell
Lockwood, J. H.	Henry
Lowe, C. E.	Mobridge
McDonald, C. J.	Sioux Falls
McGreevy, J. V.	Mitchell
McIntyre, P. S.	Bradley
McKie, John F.	Sturgis
Mabee, D. R.	Mitchell
Mabee, O. J.	Mitchell
Madsen, Mars L.	Canova
Magee, W. G.	Watertown
Malloy, J. F.	Yankton
Malster, R. M.	Carter
Manning, F. S.	Custer
Manion, J. E.	Gregory
Martin, H. B.	Harrold
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Benign Stricture of the Esophagus*

A Complication of Duodenal Ulcer

E. M. Larson, M.D.
John A. Layne, M.D.
L. L. Howard, M.D.
Great Falls, Montana

ESOPHAGEAL stenosis as a result of benign stricture, while not a rare complication of peptic ulcer, is sufficiently unusual to warrant reporting. Our purpose in this presentation is to call attention to this complication and to discuss the probable factors concerned in its production.

Case Report

P. S., a 60 year old white male, was first seen by us at the time of his entrance to the hospital on December 19, 1941. He gave a history of attacks of epigastric distress which occurred twice a year (spring and fall) for the past twelve years. His last attack started the first part of November and had persisted, associated with occasional vomiting, up until the time of his admission to the hospital. He had had the usual postcibum distress, with relief following the ingestion of milk or alkaline powders. Of late he had had increased epigastric pain and heartburn.

Physical examination at this time showed a fairly well developed but undernourished individual. The blood pressure was 124 millimeters of mercury systolic and 80 millimeters diastolic. There was a moderate peripheral arteriosclerosis. A systolic murmur was present at the apex, transmitted for a short distance toward the axilla. There was, also, a rough systolic murmur over the aortic area, transmitted into the neck vessels; no thrill was present. There was a slight left ventricular cardiac enlargement. The liver and spleen were not palpable. There was some epigastric tenderness but no masses nor muscle spasm. The prostate was normal to palpation; there were no rectal masses. The extremities and the neurological examinations showed no significant deviation from the normal.

Laboratory findings. The hemoglobin was 9.5 grams per 100 cc., the erythrocyte count was 3,140,000, and the leukocyte count was 13,350. The differential count showed 78 per cent neutrophils and 22 per cent lymphocytes. The blood Wassermann reaction was negative. Urinalysis showed the urine to be clear chemically and microscopically. Roentgenographic and roentgenoscopic examination of the gastrointestinal tract showed a marked degree of obstruction at the pylorus, there being about 80 per cent retention of the barium at the end of six hours. No note of abnormality of the esophagus was made at this time. Aspiration of the stomach the first night in the hospital showed a retention of 850 cc. of dark-colored material. There were 82 degrees (clinical units) of total acids in this specimen, but the test with Topfer's reagent (dimethylamino-azobenzol) was negative, due probably to the large amount of mucus and food and milk in the secretion. The test for lactic acid (Kelling's) was negative.

The diagnoses at this stage were: (1) duodenal ulcer with pyloric obstruction, (2) peripheral arteriosclerosis, (3) calcified aortic valve, (4) hypochromic anemia.

The patient was prepared for surgery with the parentral administration of glucose and vitamins, and nightly gastric aspirations. Two transfusions of citrated blood of 500 cc. each were given. The nightly gastric retention was never less than 300 cc. On January 8, 1942, a posterior gastroenterostomy was performed. At this time it was noted that there was much scarring about the pylorus and the first portion of the duodenum, causing the gastric obstruction. No evidence of tumor was found.

Following the operation, the patient progressed quite satisfactorily except for the development of a small pulmonary infarct in the right lower lobe on the seventh day. The gastric (Levine) tube which was placed in the stomach on the day of operation was removed on the third postoperative day. By the end of the fourth week, the patient was up and feeling quite well. At this time he first complained of difficulty in the swallowing of his solid medications. Roentgenoscopic and roentgenographic examination of the esophagus on February 18 showed an almost complete obstruction in the lower third of the esophagus about two inches above the left diaphragm (see figure 1). Although it had been possible to pass larger tubes into the stomach without difficulty one month before this, efforts to pass a small Levine tube beyond this point now were unsuccessful. Attempts were then made to dilate the stricture, and following this, the patient was able to retain from two to three liters of fluid each twenty-four hours. Additional fluids were given during this and the preceding period by vein. On March 4, however, the patient developed a sudden elevation of temperature to 103.8° F. (rectal) and physical and roentgenographic examination of the chest showed evidence of a massive pleural effusion on the left. Thoracentesis was performed with removal of 1100 cc. of thin, foul-smelling fluid containing large numbers of Gram positive, beta hemolytic streptococci. The patient's condition gradually became poorer, however, and he died on March 6.

Necropsy examination. Only the positive and salient findings will be reported. The left pleural space was filled with approximately 800 cc. of yellowish-green purulent material, rather thin in character, and the left lung was collapsed. A considerable amount of plastic exudate

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*From the departments of surgery and medicine, Great Falls Clinic.

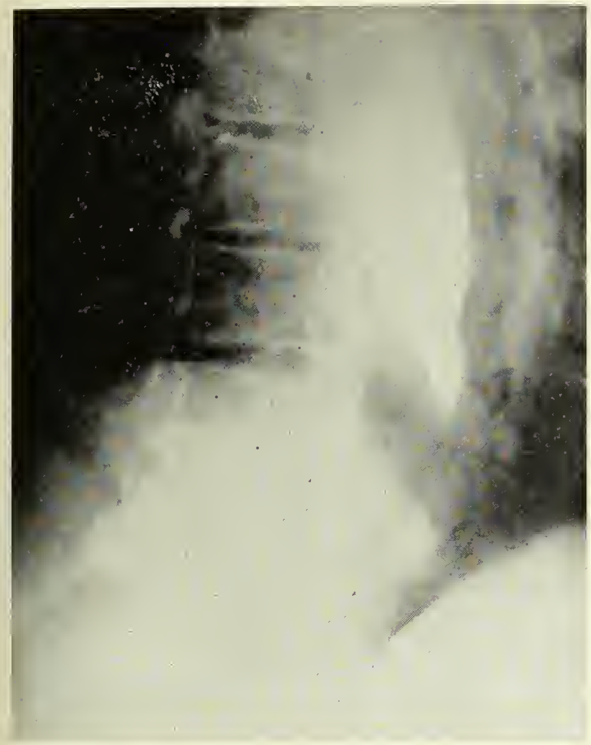

Fig. 1. Roentgenogram of the esophagus showing complete obstruction in the lower third.

was present on the lung and on the parietal pleura. The cut section of the lung showed consolidation and a purulent exudate. The right pleural cavity contained 200 cc. of a clear fluid. There was no evidence of pneumonia or infection in the right lung. The heart was small; the pericardial sac was smooth and glistening and contained a normal amount of fluid. The aortic valves were thickened and calcareous deposits were present at their base. The abdominal cavity contained no excessive amount of fluid and showed no gross abnormality to inspection. Examination of the posterior gastroenterostomy performed several weeks previously showed it to be in good condition and apparently functioning well. The stoma measured 2½ cm. in diameter and the union between the jejunum and stomach was excellent without ulcer formation at the margins, or any evidence of obstruction. The interior of the stomach showed no apparent abnormality. In the first portion of the duodenum was an old ulcer with scar tissue constriction producing almost complete obstruction. The ulcer appeared healed but there was puckering on the posterior wall of the duodenum where the ulcer was adherent to and apparently infiltrating the head of the pancreas.

The esophagus was removed along with the stomach and opened. At about the level of the middle and distal thirds, the esophagus was dilated and the mucosa was reddened and inflamed but not ulcerated. At the distal third, it was gradually narrowed so that at a point 2½ cm. above the cardiac end of the stomach, the esophagus was almost completely occluded by an hourglass type of constriction (see figure 2). In the postmortem state, this constriction admitted a probe with difficulty. There was no evidence of tumor, and no ulceration or perforation of the mucosa in this area. The esophageal wall was moderately thickened. The remainder of the findings were not pertinent.

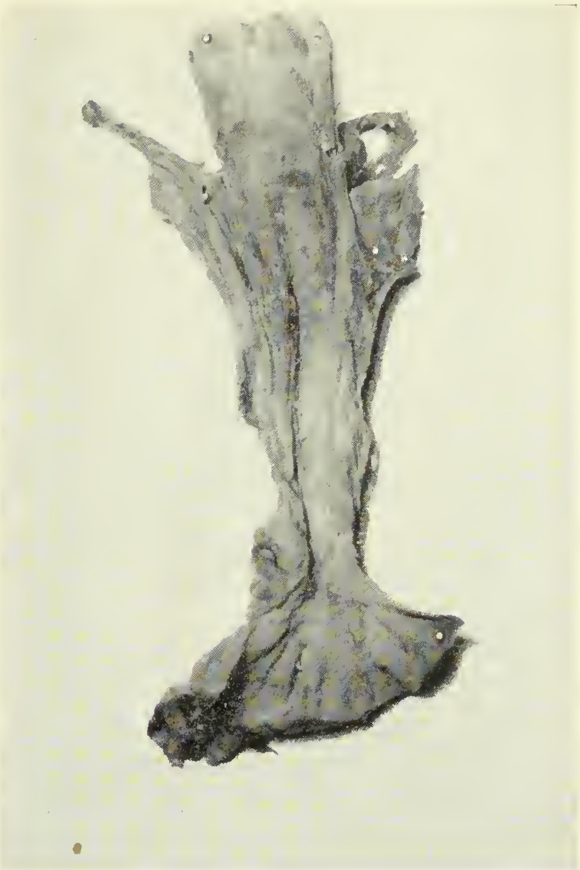

Fig. 2. Photograph of the esophagus after it had been opened, showing the dilated middle third, and the stricture 2½ cm. proximal to the cardia of the stomach.

Microscopic examination of the esophagus showed an intact epithelial layer, a chronic inflammatory reaction with round cell infiltration in the sub-mucosa, and infiltration of round cells and fibroblasts in the underlying muscle layer. There was no evidence of acute inflammation, tuberculosis, or malignancy, but a widespread chronic inflammatory reaction was present.

The final diagnoses were: (1) Benign stricture of the esophagus, (2) empyema of the left pleural space with pneumonia of the left lung (beta hemolytic streptococcic), (3) duodenal ulcer with pyloric obstruction, (4) calcified aortic valve, (5) peripheral arteriosclerosis.

Comment

Since cicatricial constriction of the hollow muscular tube of the gastrointestinal tract was produced in two places and only a few centimeters away from the stomach in this patient, one may question whether a similar cause was present in the two conditions. Esophagitis is a frequent accompaniment of diseases in which there is recurrent vomiting.[3] Although the esophagus plays a passive role in the act of vomiting, it is often dilated rapidly, and excessive movement occurs in an effort to rid itself of the material which is being regurgitated. The mechanical factors of stretching and possible small breaks in the mucosa, plus the frequent bathing of the mucous membrane by the acid gastric secretion, all lend themselves to the production of congestion and erosion. Tileston[10] and Sheehan[9] have both observed that esophageal ulceration was favored by stenosis of the pylorus or duodenum, or by an hour-glass stomach. Tileston[10] reported that pyloric or duodenal stenosis was present in 23 per cent of his 40 cases of ulcer of the esophagus. Vinson[4,12] has reported a total of nine cases of esophageal stricture that occurred following vomiting of pregnancy. In this condition, it would appear that vomiting was an important factor in the eventual production of the stricture. Following a thorough study of esophagitis, Butt and Vinson[1] concluded that vomiting and the removal of gastric contents were the only factors which showed a relation to the increased incidence of this condition. Guisez[7] believed that many of the so-called simple ulcers of the esophagus were actually only localized inflammatory processes which finally terminated in stenosis without undergoing definite ulceration. Infection of the esophagus through the lymphatics may also be a factor in the production of esophagitis, and a poor blood supply may contribute toward initiating a lesion.

The development of the stricture in this patient appears to have been quite rapid. No mention of abnormality of the esophagus was made at the time of the roentgenographic examination of the stomach in December, and no difficulty was encountered in the repeated passage of tubes into the stomach in the period before operation. Within a period of eight weeks, however, a stricture of sufficient degree to prevent the passage of a barium meal into the stomach, had developed. It is difficult to state the etiologic importance of the inlying Levine tube, but since it was left in for only three days after the operation, and is so often used before and after gastric surgery without untoward results, we do not believe it to be a prime factor in the production of the esophagitis and stenosis in this patient.

As Bell[2] has pointed out, postmortem perforation of the esophagus may occur as a result of regurgitation of acid gastric secretion after death. That regurgitation during life contributes to the production of esophagitis is still debated. Alvarez[1] has stated that ripples of reverse peristalsis running up the esophagus are probably of common occurrence in persons who suffer from digestive disturbances. Frequently in roentgenoscopic examinations, one may see the mixture of barium pass up for some distance into the esophagus from the stomach.[3] The majority of evidence favors the theory that regurgitation of gastric contents into the esophagus is a normal process in a high percentage of cases.

The esophageal mucous membrane is nearly always covered by its own special mucoid secretion.[11] This mucus has no enzymic powers and differs in this manner from other secretions of the alimentary tract. Therefore, it protects at all times the mucous membrane of the esophagus. If this mucus is removed or altered, or if the continuity of the esophageal mucosa is broken, the mucosa would then be more easily injured. The association of peptic ulcer and esophagitis has been noted by many observers. Butt and Vinson[1] report a series of 213 patients with esophagitis in which there were 42 individuals with peptic ulcer (20 per cent). Friedenwald, Feldman, and Zinn[5] produced small lesions in the esophagus of the dog through an esophagoscope and observed that under normal conditions they healed rapidly. However, they could prevent rapid healing of the erosion by the use of hydrochloric acid. Deep ulcerations could be made to perforate or their healing markedly retarded by the continuous use of hydrochloric acid.

CONCLUSIONS

1. A case of benign stricture of the esophagus complicating duodenal ulcer with obstruction is reported.
2. A brief review of the factors relating to the production of this condition is included.

REFERENCES

1. Alvarez, W. C.: The mechanics of the digestive tract: an introduction to gastroenterology, New York, Paul B. Haeber, Inc., 1928.
2. Bell, E. T.: A textbook of pathology, Philadelphia, Lea and Febiger, 1938.
3. Butt, H. R., and Vinson, P. P.: Esophagitis. I. Anatomy and physiology and a review of the literature, Arch. Otolaryng. 23:391 (April) 1936.
4. Butt, H. R., and Vinson, P. P.: Esophagitis. II. A pathologic and clinical study, Arch. Otolaryng. 23:550 (May) 1936.
5. Friedenwald, J., Feldman, M., and Zinn, W. F.: Ulceration of the esophagus: experimental study, Arch. Int. Med. 42:521 (Oct.) 1928.
6. Friedenwald, J., Feldman, M., and Zinn, W. F.: Peptic ulcer of the esophagus, Am. J. Med. Sci. 177:1, 1929.
7. Guisez: Quoted by: Friedenwald, Feldman, and Zinn.[6]
8. Robins, S. A., and Jankelson, I. R.: Cardioesophageal relaxation, J.A.M.A. 87:1961 (Dec. 11) 1926.
9. Sheehan, J. E.: Ulcer of the esophagus from the standpoint of an esophagoscopist: its cause, symptomatology, diagnosis and treatment, Med. Rec. 97:319 (Feb. 21) 1920.
10. Tileston, W.: Peptic ulcer of the esophagus, Am. J. Med. Sci. 132:240 (Aug.) 1906.
11. Vineberg, A. M., and Komarov, S. A.: The influence of the vagus nerve on esophageal secretion, Am. J. Physiol. 104:73, 1933.
12. Vinson, P. P.: Esophageal stricture following the vomiting of pregnancy, Surg., Gynec. & Obstet. 33:412 (Oct.) 1921.

Elimination Diets for the Study and Treatment of Food Allergy

Albert H. Rowe, M.D.
San Francisco, California

ELIMINATION diets have been devised by the writer for the diagnostic analysis and treatment of food allergy. First proposed in 1928[1] and revised in 1934,[2] they contain those foods which infrequently produce clinical allergy. Such foods have been determined by skin reactions, by histories of food idiosyncrasies, and by trial diet; the allergenic activity of such foods was finally checked by the actual production of the same symptoms by feeding these foods to the patient. Recently[3] a few changes have been made in the diets so that they will be more effective for the recognition of food sensitizations.

The fallibility of skin testing[4] with food allergens requires the routine use of trial diet in most patients suspected of food allergy. Test negative diets which exclude reacting foods at times relieve symptoms due to food allergy. Skin reactions by the scratch test often are definitely positive to foods productive of immediate and marked allergy. Where chronic or delayed symptoms from food allergy exist, however, the reactions by the scratch test are frequently negative and the intradermal as well as the scratch test often give positive reactions indicative of past or potential allergy or due to nonspecific irritative substances. Thus whether positive or negative reactions occur, the allergenic effect of foods in question remains to be determined only by trial diet. For such purpose the writer's elimination diets offer a standardized procedure.

In the last ten years the writer has found allergy to one or more cereals occurring more often than to the legumes. Therefore his cereal free elimination diet has been used increasingly for initial study of suspected food allergy. Diets 1 and 2 containing rice, corn and rye have been of second choice especially if allergy to legumes has been suspected. New detailed menus for these diets, for elimination diets eaten away from home, for fruit-free elimination diets, for reduction elimination diets and elimination diets for the study of diabetic patients suspected of food allergy recently have been published. Elimination diets for infants and young children are also arranged.[3] Moreover, new and revised recipes, especially for bakery products have been prepared. Elimination diets like such laboratory tests as blood counts or Wassermann reactions should be used as diagnostic tools. Their use does not imply a priori the presence of food allergy.

The following facts must be remembered for adequate diet trial. (1) Traces of foods may remain in the intestinal tract for two or more weeks and food allergens may persist in the cells of the body tissues for days or possibly longer. Moreover, the changes in the cells and tissues of the shock organs may be marked, even irreversible, in type. Therefore, though evidence of relief of symptoms may arise in a few days, the elimination diet often must be taken for two or more weeks before definite improvement arises, and for maximum improvement the diet may have to be accurately followed for several months. (2) Because of refractoriness or desensitization arising at times after severe allergy, symptoms especially from food allergy may be cyclic with partial or complete intervening freedom. Then if such attacks arise every one or two months, diet trial must continue at times for several months to be certain that the period of relief is longer than that of the usual relief. (3) The fact that food allergy in many patients decreases in the summer months, increasing to a maximum in December and January and that maritime areas increase symptoms of food allergy,[5] must be remembered in the interpretation of results from diet trial.

Thus, since prolonged diet trial is often necessary, the menus for the selected elimination diet must allow interesting meals with possible variations and must assure the maintenance of a proper weight and nutrition. Menus for the various elimination diets as published by the writer[3] meet these requirements. Undesirable weight loss must be prevented by extra calory-carrying prescribed foods. Approximate amounts of vitamins in the patient's prescribed menu can be estimated from recent tables. Vitamin D must be ordered in a prescribed oil, such as viosterol in sesame oil, and not as cod liver oil, until fish is added to the diet. The synthetic B vitamins, moreover, should be used rather than the natural B vitamins in rice or yeast if such have not been included in the diet. The fruit free elimination diet, especially, necessitates additional vitamin C. Occasional allergy to vitamin C requires vegetables rich in this vitamin. Such vitamin therapy and extra calcium when milk is excluded are discussed in the directions for the use of the diets published elsewhere.[3]

Successful diet trial requires absolute adherence to the prescribed diet. At the start, extreme allergy to all excluded foods must be assumed and no trace of them must be ingested. Clean utensils, dishes, knives, forks, and spoons are imperative. If the patient eats away from home, he must be provided with simple menus for the prescribed diet. If the ingredients of any prepared food are in question, it should never be eaten. Canned soups and soups away from home contain forbidden foods such as egg, pastes, condiments, and pepper. Only specified sugars, oils, shortenings and flavors can be used. Bakery products must be made at home or by supervised honest bakers, from recipes for the prescribed diet.[3] The use of bread or cookies containing unrecognized wheat, milk, egg, or other ingredients excluded from the diet often prevents relief. Thus good results from trial diet requires critical supervision by the physician and 100 per cent coöperation of the patient at all times.

After relief of symptoms develops for a longer period than naturally occurs, one additional food can be tried every five to seven days. Other foods in the three elimination diets can be added first. Then other fruits, vegetables, fish, and nuts may be added. Egg, milk, and wheat may be tested last or earlier if nutrition so demands. Allergic reactions from a food may occur in a few minutes, hours, or days and at times a food must be taken for two or more days or even for two to four weeks before tolerance which has been raised by its elimination is again reduced. The seasonal and climatic effect on food allergy mentioned above must also be remembered. Reacting foods must be excluded. At times the resultant symptoms are so slight that several trials of the food in the symptom free patient are necessary to judge its allergenicity correctly. Gradually tolerance for the allergenic foods and the degree of their exclusion for continued relief can be determined.

NECESSARY RECOGNITION OF OTHER TYPES OF ALLERGY

It must be remembered that food, inhalant, infectant, or drug allergies may be individually responsible for allergic symptoms or that two or more may be operative in the same patient. This is shown in Table I by the various types of allergy which are recognized causes of the many clinical symptoms which may arise from allergy.

GENERAL DIAGNOSTIC STUDY

The discovery of all physical, metabolic, endocrine, nutritional, and psychotic abnormalities which might be responsible for the patient's symptoms is most necessary before allergy can be given therapeutic consideration. Allergy and other diseased states may coexist. Thus, a properly taken history, physical examination, and all indicated laboratory and roentgen ray studies are imperative. The successful allergist must be a well qualified internist.

MANIFESTATIONS OF FOOD ALLERGY

The many manifestations of clinical allergy with the types of allergy in order of frequency usually responsible are shown in Table I. From this information it is obvious that all types of allergy must be considered in the study of most patients.

In this paper comment is only possible on some of the manifestations of allergy.

BRONCHIAL ALLERGY

Until the causes of the patient's bronchial asthma become evident food, inhalant, and to a lesser degree, infectant allergies need constant consideration. Even when the seasonal history and skin reactions stress pollen as the major cause, food allergy or other inhalant allergy may complicate the etiology. For such study of food allergy, elimination diets modified by definite scratch reactions or by history of possible food idiosyncrasies offer a standardized routine. Food allergy is especially suggested by recurrent attacks of asthma often preceded by nasal allergy which produces an apparent "head cold" for a day or so. The relief between such attacks may be due to refractoriness. Such cyclic asthma usually becomes more frequent or less acute and finally a chronic persistent asthma develops. Asthma due to food allergy, moreover, may become less or be absent in the summer months and away from the ocean or bay areas.

Thus food allergy with or without inhalant and at times infectant allergies may be responsible for bronchial asthma at any time of life. In the relieved or symptom-free patient, the true role of each of these important possible causes can be determined by intentional feeding of suspected foods and of exposure to inhalants in question. The role of possible bacterial allergy must also be gradually determined by the effect of the removal of foci of infection and by carefully administered vaccine therapy.

The symptomatic treatment of bronchial asthma and the specific and non-specific methods of therapy have been discussed elsewhere.[4,5,6,7]

NASAL ALLERGY

The types of allergy responsible for nasal allergy are shown in Table I. Food allergy at times is operative only during the pollen season. Grass pollen sensitization especially may be associated with cereal grain allergy. In fact, Benjamins reported relief in such patients merely with a cereal free diet. One of the writer's patients who was sensitive to grass pollen needed no treatment with an egg-free diet, and another acacia-pollen-sensitive patient who was not relieved with prolonged pollen treatment, was entirely controlled with a cereal-free elimination diet without continued pollen therapy.

Food allergy more frequently is the sole or complicating cause of perennial nasal and sinal allergy. The history of repeated head colds, nasal congestion, sniffling, post-nasal mucus with hacking and throat clearing, and especially intermittent or nearly constant blocking of the nose should suggest food and inhalant allergies individually or in association. Food allergy may also produce watery and especially mucoid discharge, sneezing but slight or not actual itching which is so frequent with inhalant allergies. In the perennial cases, opacity of antra due to edematous mucosa, retained mucus, or absence of air may be due more frequently to chronic allergy, especially to foods, than to infection. Clumps of eosinophiles are usually found in the stained smears of the nasal mucus.

When food allergy is suspected in these patients, elimination diets may well be used to determine its etiologic role.

ATOPIC DERMATITIS

Food allergy may cause atopic dermatitis at any time of life especially in infancy. Inhalant allergy gradually assumes increasing importance either as a sole cause or in association with food allergy.[5] For the study of food allergy in infancy and early childhood, cereal free elimination diets for these ages have recently been published.[3] A soy bean emulsion containing ingredients comparable to those in milk can be made inexpensively[3] in the home or purchased in cans. When food allergy is suspected at any age, the elimination diet must maintain nutrition and weight.

Urticaria and Angioneurotic Edema

Food allergy is the most important cause of these cutaneous edemas throughout life. As indicated in Table I, drug and bacterial allergies are secondary in importance to food allergy. Because of the frequency of fruit allergy, often to group allergens in all fruits, the fruit-free cereal-free diet is used initially in these patients. Those foods most frequently productive of other allergic manifestations also produce these edemas and are excluded from this elimination diet.

Improvement may be evident in one or two weeks after which the fruit-free elimination diet may have to continue for weeks or months until the last evidence of the edemas disappear. Thereafter, the various foods can be added individually to determine the reëstablishment of tolerance. At times, months or even years are required to regain such tolerance.

Though this article does not deal with palliative treatment, it is proper to advise the hypodermic administration of epinephrine 1:1000 as necessary for relief, to recommend barbital sedatives, remembering that allergy may arise to them and other drugs, and to report unsatisfactory results from histaminase in most all cases of urticaria and angioneurotic edema. Alexander has recently reported benefit from histamine therapy in chronic urticaria.

Acne

Good results from elimination diets in acne vulgaris, first observed by the writer in 1931, were again discussed in 1937. Similar benefit with such diets was reported by White in 1934 and by Cormia in 1940. This benefit naturally has suggested food allergy as a possible cause. Such allergy, moreover, has been indicated by the rapid increase in acne after small amounts of milk, egg, chocolate and other foods in certain patients. Allergy is also suggested by acne from iodides in susceptible individuals.

Recently good results similar to those with elimination diets have been reported by Sutton[9] with low-fat diets. Milk, butter, chocolate, bacon, fats of meats, oils and shortenings are excluded. He attributes acne to a pustular epidermal lipoidosis due to improper metabolism of lipoids.

Gradually it will be possible to decide whether food allergy or impaired lipoid metabolism explains the good results from the above diets. At present we continue to use the elimination diets. Fats are cut to a minimum providing a satisfactory weight is maintained. The activation of some acne by iodized salt and the possible increased tolerance for iodine resulting from thyroid medication as suggested by Sutton are kept in mind. Autogenous vaccine is given when pustules are frequent. Dermatologic therapy including roentgen ray treatment is reserved for the minority of patients who fail to respond satisfactorily to diet manipulation.

Gastrointestinal Allergy

Food allergy, especially, causes many oral gastric, intestinal, and colonic symptoms which have been fully discussed elsewhere.[5] Allergy, especially to fruits, is most frequently responsible for canker sores though Table I indicates other causative allergies. Allergic gingivitis, glossitis, and pharyngitis may also arise from food and drug allergens. The occurrence of distention, pyrosis, belching, nausea and vomiting due to allergy in the mucosa, glands and smooth muscle of the stomach or small intestine has been emphasized by the writer for the last decade. Abdominal cramping, soreness and pain, diffuse or localized due to localized allergy in the small intestine, colon, hepatic or other visceral tissues must be remembered. So-called cecal allergy, the allergic appendix with eosinophilic infiltration, the pain and soreness simulating gall-bladder disease or colic and the severe pain suggesting intestinal obstruction arising from allergy, especially to foods, must be recalled. The possible allergic etiology of peptic ulcers which may be similar to canker sores in the mouth is indicated by clinical observations in certain patients.

Colonic allergy especially needs more emphasis. Mucous colitis, the irritable and unstable colon, diarrhea and constipation require the study of possible food allergy as one important cause.

In the last four years, the writer[16] has studied a number of cases of chronic ulcerative colitis whose symptoms have been controlled largely through the use of the cereal free elimination diet, indicating that food allergy and probably other types of allergy may be important in the etiology of this serious disease. Mackie[10] has also reported food allergy as a factory. Allergic inflammation with canker-like ulcerations of varying degrees and severity with secondary bacterial infection, cellulitis, and scar tissue formation may explain the varying pathology of this disease.

Finally pruritus ani is often due to localized allergy frequently to foods.

For the study of food allergy in most of these gastrointestinal manifestations, the fruit-free elimination diets[3] are of special value. They may be ordered in soft, pureed, or minced form especially when gastritis and colitis are present.

Migraine, Recurrent Sick Headaches, Cyclic Vomiting, Epilepsy

The writer for many years[5] has emphasized the frequency of food allergy as a cause of migraine, recurrent sick headaches, recurrent nausea and vomiting, and other symptoms which are equivalents of migraine. Cyclic vomiting with or without headache is also frequently due to food allergy, and is a fore-runner in many instances of subsequent migraine or recurrent sick headaches. All of these symptoms require prolonged study of possible food allergy with elimination diets, since the irritability of the cerebral tissues and the causative allergens themselves may remain for weeks. Careful physical and laboratory examinations must rule out all actual pathology especially in the gastrointestinal tract and the gall-bladder. It must be remembered that such pathology may coexist with food allergy which may be the primary cause of these symptoms. The existence of cerebral allergy in these patients recalls the occurrence of allergy of the cranial and peripheral nerves and the spinal cord as discussed by Kennedy and others. Cerebral allergy may also produce nervousness, irritability, insomnia, nightmares, and incorrigibility, especially in children. As in all allergic manifestations other types of allergy than food must always be considered as indicated in Table I.

It is also important to note that the localized cerebral reactions arising from food or inhalant allergy are at times responsible for idiopathic epilepsy[5] even of the Jacksonian type. Bacterial allergy may also be responsible. The possible allergic origin of such epilepsy stresses the importance of its thorough consideration in more of these patients than is occurring today.

ALLERGIC TOXEMIA, FEVER, ANOREXIA, MALNUTRITION

Allergic toxemia due to pollen was reported by Kahn[12] in 1927, and to foods by the writer in 1930.[5] Localized cerebral meningeal edema is probably responsible and is often associated with nasal allergy and migraine or recurrent sick headaches.

Elimination diets for the study of possible food allergy and the consideration of other types of allergy often relieves the drowsiness, fatigue, lack of energy, inability to concentrate, and muscular joint pains. A few patients have had generalized edema especially evidenced by rapid increases in weight associated with these toxic symptoms.

Food allergy is also responsible for unexplained fever in certain patients. One boy with a fever between 99.4° F. to 100.2° F. every afternoon and evening with night sweats was relieved with elimination diets and egg was finally incriminated. Another patient in spite of negative pulmonary findings had been in a tuberculosis sanitarium for eight months because of such fever, toxemia, nasal and gastrointestinal symptoms because of which nasal and exploratory abdominal surgery had been done. Food allergy was found responsible with the use of elimination diets.

Distastes and aversions for foods may indicate allergy. When allergy is severe, especially when in the gastrointestinal tract, anorexia in childhood extending into adolescent and adult life may result. Such aversions for foods and anorexia may lead to undernutrition due to an inadequate vitamin protein and calorie intake which increases susceptibility to infection and also results in lack of growth and underweight. With elimination diets the possibilities of food allergy can be explored and its symptoms relieved.

ALLERGIC ARTHROPATHIES

The writer first reported a case of Dr. V. Alderson's of intermittent hydrarthrosis due to food allergy in 1931. Since then several other cases were recorded by the writer in 1937.[5] In 1939, Berger[13] discussed allergy as a cause of this manifestation. One case of intermittent hydrarthrosis of many months duration was relieved by the elimination of a prostatic infection indicating bacterial allergy as a cause. In 1937, soreness, limitation of motion, varying degrees of swelling in joints, especially due to food allergy, was also discussed. One patient with allergy of tendon sheaths and some synovial membrane allergy of the joints leading to spasmodic flexion of the fingers, toes, hands, and feet due to wheat, milk and egg allergies was reported. Several cases of rheumatoid arthritis have been markedly relieved by the elimination of allergenic foods and other evidences of allergic arthritis are increasing. The initial use of a fruit-free, cereal-free elimination diet seems advisable in many cases.

OCULAR ALLERGY

Perennial and at times seasonal conjunctivitis is due to food allergy, inhalant allergy being more frequent. Granulated lids with a "sandy" feeling in eyes often result from food allergy. Recurrent corneal ulcers[5] necessitate consideration of food allergy along with drug, bacterial, or inhalant allergies. It is probable, moreover, that some cases of recurrent iritis and uveitis may be due to ingestants. Blepharitis, with varying degrees of more disseminated atopic dermatitis especially on the face, neck, and arms, is usually due to pollen and also to other inhalant allergy but food allergy may be of primary or more frequently of secondary importance.

Difficulties in refraction and pain and aching in the eyes may be relieved by the control of chronic food and other types of allergy especially in patients having other allergic manifestations. Ophthalmologists, moreover, must remember the frequency of ocular pain in migraine, recurrent sick headaches, and neuralgia due to food

UROGENITAL ALLERGY

Food allergy especially to wheat, milk, eggs, and fruits produces allergic inflammation in the bladder and urethra and smooth muscle spasm in the ureter and bladder in certain patients. Negative urological findings in a patient with other allergic manifestations should suggest such etiology. Eosinophiles in the urine would offer extra evidence. The possible allergic etiology of Hunner's ulcers is a challenge for study. Drug allergy and at times inhalant allergy produce urogenital symptoms.

Food allergy rather infrequently produces edema, allergic inflammation or smooth muscle spasm in the Fallopian tubes, uterus, vagina, and vulva. The writer reported various menstrual disturbances and leucorrhea apparently due to food allergy in 1932. Localized intermittent inflammation or canker-like lesions[14] in the vulva due to food allergy have also been observed.

Vascular allergy as emphasized by Rössle, Manwaring, and others is fundamentally important in most allergic reactions as evidenced in urticaria, erythema, and atopic dermatitis. Other manifestations of possible vascular allergy follow. The allergic origin of periarteritis nodosa is suggested by the frequent blood eosinophilia and eosinophilic infiltration in the vascular necroses. Harkavy[15] and others favor vascular allergy from tobacco and possibly other allergens as the cause of thrombo-angiitis obliterans. Erythema nodosum and multiforme are generally attributed to vascular allergy. The possible role of allergy in some cases of angina pectoris and hypertension has clinical support. Allergic purpura from food, drug, and probably bacterial allergy is recognized. Drug allergy in the blood forming organs is the best explanation of agranulocytosis. Finally, the vascular and muscular tissues of the heart cannot be exempt from allergic reactions. Thus transient changes in electrocardiogram and irregularities including paroxysmal tachycardia have been studied with allergy in mind. Future clinical investigations will be required to reveal the true role of food, drug, bacterial, and even inhalant allergies in the vascular diseases.

Conclusions

1. Elimination diets for the study and control of food allergy are again recommended.
2. They should be used as diagnostic tools when food allergy is suspected.
3. The cereal-free elimination diet and the fruit-free elimination diet are of special value and elimination diets for infants, children and for diabetic and obese patients suspected of allergy are now available.
4. Because of the prolonged diet trial necessary in many patients, detailed menus are published and emphasis is laid on the necessary protection of protein, vitamin, and chemical balance and the maintenance of a satisfactory weight.
5. Food allergy as a cause of bronchial asthma, nasal allergy, migraine, recurrent headaches, cyclic vomiting of childhood, various gastrointestinal symptoms, urticaria, angioneurotic edema, and atopic dermatitis is pointed out.
6. The possible role of food allergy in acne vulgaris, chronic ulcerative colitis, allergic arthropathies, urogenital and cardiovascular manifestations is also considered.

TABLE I.

Manifestations of Clinical Allergy

(Types of Allergy responsible according to probable frequency)

1. Bronchial asthma, allergic bronchitis, and croup
   (a) foods (b) inhalants (c) drugs (d) bacteria.
2. Nasal Allergy (hay fever)
   (a) *seasonal* (1) pollen (2) animal emanations (3) dusts (4) orris root, pyrethrum, kapok, cottonseed, silk, etc. (5) foods (6) bacteria.
   (b) *perennial* (1) animal emanations and dusts (2) foods (3) orris root, pyrethrum, kapok, cottonseed, silk, etc. (4) bacteria.
3. Atopic Dermatitis (due to blood borne allergens)
   (a) foods (b) pollens (c) animal emanations including silk (d) orris, pyrethrum, kapok, cottonseed, etc. (e) house and other dusts (f) infectants—fungi, bacteria.
4. Urticaria (superficial skin capillaries are shock tissues)
   (a) foods (b) drugs (c) bacteria (d) inhalants (e) parasites (f) physical allergy.
5. Angioneurotic Edema (deeper blood vessels of skin are shock tissues) (causes under No. 4).
6. Contact Eczema (epidermal cells are sensitized)
   (a) contactants of all types responsible (b) the patch and not the urticarial immediate type of skin reaction occurs.
7. Acne—Possible allergic etiology? Abnormal fat metabolism more important.
   (a) foods (b) inhalants (c) drugs—including halogens (d) infectant allergies (?)
8. Migraine, sick headaches, cyclic vomiting, and recurrent bilious attacks
   (a) food (b) bacteria (c) inhalants. Recurrent peripheral neuralgia and paresis and idiopathic epilepsy at times due to allergy.
9. Gastrointestinal allergy (canker sores, oral and pharyngeal inflammation, distention, pyrosis, nausea, vomiting, abdominal cramping and pain, diarrhea, constipation)
   (a) foods (b) drugs (c) bacteria and parasites (d) inhalants.
10. Ocular—seasonal and perennial conjunctivitis, recurrent iritis and corneal ulcers, blepharitis, ocular and orbital pain. (See migraine).
    Inhalants and foods are most important and vary according to the manifestation. Drug and bacterial allergy are also important.
11. Miscellaneous
    (a) cardiovascular (1) susceptibility to transient cardiac irregularities (?) (2) periarteritis nodosa (?) (3) erythema nodosum and multiforme (4) glomerulonephritis (?) (5) hypertension (occasional case)
       (a) foods and drugs (b) bacteria (c) inhalants (?).
    (b) arthropathies (1) possible role of food and bacterial allergy in rheumatoid arthritis (2) intermittent hydrathrosis
    (c) urogenital (1) allergic cystitis (2) spasm in ureter and bladder (3) Hunner's ulcers (?) (4) vulval canker-like lesions and inflammation
       (a) foods (b) drugs (c) bacteria (d) inhalants.
    (d) allergic toxemia
       (a) foods (b) pollen.
    (e) allergic purpura, agranulocytosis
       (a) drugs (b) foods (c) bacteria (?)
    (f) unexplained fever
       (a) foods (b) inhalants (c) drugs (d) infectant allergies.

Bibliography

1. Rowe, A. H.: Food allergy: its manifestations, diagnosis and treatment, J.A.M.A. 91:1623, 1928.
2. Rowe, A. H.: Revised "Elimination Diets" for the diagnosis and treatment of food allergy, Am. J. Digest. Dis. & Nutrition 1:6, 1934.
3. Rowe, A. H.: Elimination Diets and the Patient's Allergies, Philadelphia, Lea & Febiger, 1941.
4. Rowe, A. H.: The evaluation of skin reactions in food sensitive patients, J. Allergy 5:135, 1934.
5. Rowe, A. H.: Clinical Allergy, Philadelphia, Lea & Febiger, 1937.
6. Rowe, A. H.: Bronchial asthma: its diagnosis and treatment, J.A.M.A. 111:1827, 1938.
7. Rowe, A. H.: Bronchial asthma, Nelson's Loose Leaf Medicine, 1940.
8. Alexander, H. L.: Treatment of allergic disorders with histamine and histaminase, L. Lab. & Clin. Med. 26:110, 1940.
9. Sutton, R. L.: Acne vulgaris: new concept of etiology: a disturbance of lipoid metabolism, J. Missouri S. M. A. 38:50, 1941.
10. Mackie, T. T.: Medical management of chronic ulcerative colitis, J.A.M.A. 111:2071, 1938.
11. Kennedy, Foster: Allergy and its effect on the central nervous system, Arch. Neurol. & Psychiat. 39:1361.
12. Kahn, I. S.: Pollen toxemia in children, J.A.M.A. 88:241, 1927.
13. Berger, H.: Intermittent hydrarthrosis with allergic basis, J.A.M.A. 112:2402, 1939.
14. Jones, O. V.: Cyclic ulcerative vulvitis and stomatitis, J. Obstet. & Gynec. of British Empire 47:557, 1940.
15. Harkavy, J., Hebald, S., Gilbert, S.: Tobacco sensitiveness in thromboangiitis obliterans, Proc. Soc. Exp. Biol. & Med. 30:104, 1932.
16. Rowe, A. H.: Chronic ulcerative colitis—allergy in its etiology, Annals of Internal Medicine (July) 1942.

Should the Hearing of College Students be Tested?*

Edmund Prince Fowler, Jr., M.D.
New York, New York

JUST how big is the problem of deafness among college students? Is it worth bothering about? How many college students are actually hard of hearing? We do not know exactly, but we do know the number is very large. Caplin[1] in his report on "The Hearing in Secondary Schools of New York," 1937, reports there are 30,000 boys and girls with appreciable deafness in both ears, out of 770,150 public school children. That is about 4 per cent. There are similar numbers with deafness in one ear, and 75,000 (over 10 per cent) who needed medical attention for their ears. Since we know that the incidence of deafness increases with age, we know the percentage must be higher in college students, especially where girls are in the student body. Otosclerosis will account for a substantial increase in the ages between 17 to 24.

Beasley[2] in a National Health Survey, begun in 1935, shows a history of severe deafness to be present in 9.37 per cent of the age group of 15 to 24 years as contrasted with 6.6 per cent of the age group, 5 to 14 years, while there is a history of slight deafness in 6.5 per cent of the 15 to 24 age group and 8.5 per cent of the 5 to 14 group. Many more are found to have deafness of one kind or another if carefully tested for all notes between 64–16,000 double vibrations, as shown by Beasley in his later reports.

Besides deafness, there is active middle ear disease and chronic mastoiditis which goes neglected on many college campuses. These may not be causing deafness at the moment, but without the very necessary medical care and proper guidance, the future is uncertain indeed for the hearing of these students. Roughly, we can safely state that there are between 150 and 200 students out of every 1,000 who need attention for their ears during each college year.

The injurious effect of deafness is not only the student's inability to hear his teachers. The hard of hearing individual has a tendency to shrink into himself because he is unable to hear his fellows. As a rule, he becomes morose, retiring and suspicious (early symptoms of dementia præcox). Occasionally, if his psyche is of the characteristic type, he over-compensates the other way and becomes loud-mouthed and boisterous and overbearing (early symptoms of paranoia). On the other hand, with a little understanding the student can be encouraged to learn lip reading, to wear a hearing aid, to sit in the front of the room during classes, and to select subjects which he can hear. With such help the psychic symptoms will usually disappear. Such guidance will often change the whole life of a college student.

Hard of hearing students have particular trouble with foreign languages. They repeat, year after year, their study of the same language, sitting in the back of the room, wondering why they cannot understand. The delicate lisp of C, Z, and D of Castilian Spanish requires particularly acute hearing for the high tones. So does the "CH" of German, the "TH" of English, and numerous other consonant sounds in all tongues. High tones are often lost in the incipient stages of disease of the inner ear, and such losses are particularly insidious and difficult to appreciate for the sufferer.

Even moderately hard of hearing students have difficulty understanding in large lecture halls, especially if an instructor's voice is weak or the auditorium acoustics are faulty. The deafened student appears stupid and tries so hard to piece together what he does hear that he becomes fatigued and is unable to carry on efficiently.

Deafened individuals often inadvertently prepare themselves for a job which needs good hearing. If they had been informed, they might have concentrated upon other equally promising work in which good hearing is less essential.

Deafened students should, in general, concentrate upon such courses as mathematics, the sciences, and art, with special care to work in small groups. They should take laboratory courses where their handicap will not prevent proper instruction. They should be trained in work which can be done without listening to someone else, especially listening to several people at once. They should select a profession where the ears are not important. A deafened student who wants to go into medicine for example should not plan to prepare himself for general practice, but rather for medical research. Others, according to their bent, should try to train for work with their hands as does a dentist or architect, or commercial artist, or they should acquire a job where they are able to work more or less alone, as does an author or to a large extent an accountant—rather than train for work with people as does a criminal lawyer, salesman, or politician. Help along these lines may be given by college advisors if they are acquainted with the student's difficulty.

How can the college authorities take effective steps about the hearing of the student body? I believe it behooves the medical services of any college to test the hearing of its charges. If possible, this should be done with a pure tone audiometer in a sound-proof room by a competent operator. Such facilities are often found in speech departments where it is essential to weed out those whose speech difficulties are due to faulty hearing of certain letters. When a good reason for testing hearing is found, it is usually done. Apparatus and technicians may often be borrowed from medical schools, leagues for the hard of hearing, private physicians, or hearing-aid companies. It would be ideal if every student could be tested once each year; failing this, at least the freshman class should be screened.

If pure tone complete audiograms cannot be done, phonograph group tests or quick sweeping through all frequencies with an audiometer set at just below normal are rapid and often feasible. Those with abnormal hearing so screened out may then be more carefully tested. The importance of a full audiogram for everyone should however be emphasized. At some later date, it might be of great help to an examining otologist to know that during the freshman year in college, the hearing was normal or just beginning to slip for the high notes, etc. If audiometric testing is impossible for any reason, at least those students who are aware of their difficulty could have special instruction and advice, and of course, those with obvious pathological conditions in their ears should be referred to a competent otologist. Unfortunately, definite evidence of pathology is only apparent in about 50 per cent of all deafened individuals. We cannot rely upon the appearance of the ear drum.

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*Presented at the twenty-second annual meeting of the American Student Health Association, New York City, December 30-31, 1941.

When a deafened student is weeded out, what can be done for him? It is possible he has been deaf for years and has been treated by several eminent otologists who claim that further treatment is hopeless. However, there is still much which may be done in the way of guidance and prevention of further deafness. According to Fowler, students should be taught care of the ears in their hygiene courses.[3] Most deafness grows worse with repeated colds. Deafened patients, especially those with middle ear disease, either active or healed, should be particularly careful of colds and remain in bed with these infections. They should stay in the same temperature as much as possible and if sinusitis develops, consult an otolaryngologist. They should not indulge in swimming. Of course, they should learn to swim, but with a breast and side stroke, not the crawl. Having learned enough to avoid drowning, they should take up tennis, golf, or horseback riding, or some other non-aquatic sport. They should sit on the front seats in classrooms, learn lip-reading, and often should use a hearing aid.

Smoking should be discouraged, because it causes low grade posterior rhinitis and sinusitis, and occasionally, direct poisoning of the auditory nerve. If infectious diseases, such as mumps, scarlet fever, or measles, break out in the student body, the ears should be watched and the students warned not to leave their beds too soon, or serious complications may result.

In conclusion, all colleges should take steps to help their hard of hearing students as much as possible until the day when they are equipped to do yearly tests and refer everyone with the slightest loss to an otologist who will provide the appropriate care. In spite of the relative paucity of research being done in this field every year, more and more can be done for the deafened. I hope the colleges will organize for the detection, treatment and proper management of the hard of hearing among its student body.

REFERENCES

1. Caplin, Daniel: Conservation of Hearing of School Children: a report on The Hearing in Secondary Schools of New York, June 1, 1937.

2. Beasley, Willis C.: Sex Differences and Age Variations in Hearing Loss in Relation to Stage of Deafness, National Health Survey, 1935-'36.

3. Fowler, Edmund P.: The Prognosis of Moderate Deafness in Youth, Tr. Am. Laryngol. Rhin. & Otol. Soc. 41:35, 1935.; N. Y. State Med. J. 36:607, 1936.

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MINNEAPOLIS, MINN., AUGUST, 1942

THE IMPORTANCE OF PRESERVING ROENTGENOGRAMS

When a clinician examines a patient, he often learns that X-ray films have been made of the chest at some previous time. It is important that he procure these films for study. All too frequently when he communicates with the laboratory or hospital where they were made, he is informed that they have been destroyed. Many laboratories and hospitals preserve roentgenograms for only a brief period of time, usually not exceeding five years, after which they are sold or destroyed. This is an extremely unfortunate practice because at any time during the patient's life every film made, particularly of the chest, may become of great value to the clinician.

It is often argued that X-ray reports and readings suffice, but these are not adequate for several reasons. First, in viewing a roentgenogram it is absolutely impossible to describe all that one actually sees so that another person, or even the same person, can later visualize it. Second, everyone who reads these films occasionally overlooks small shadows or, if he does see them, he may not consider them significant and, therefore, may make no mention of them in the report. When such shadows are later proved to represent significant lesions, it is extremely important that the previous films be available to the clinician. Third, many persons with entirely clear films at a certain time may subsequently develop significant lesions which cast shadows, and the clinician may desire to inspect the previous films, since they give him some idea of the duration of the disease present. Fourth, when shadows are seen on the X-ray film indicating the presence of lesions in the chest, the clinician needs these films for comparison with those made subsequently to determine whether changes have occurred with reference to the extent and nature of the shadows. Fifth, not infrequently the clinician wishes to report on groups of patients he has examined and treated over a period of many years. He assumes that the laboratories or hospitals to which he has sent his patients have carefully preserved the X-ray films as a part of their permanent records. Upon attempting to assemble these films, he finds that this most priceless part of his material has been disposed of without notifying him.

X-ray laboratories and hospitals which destroy films at specified intervals state that they do not have adequate room for storage. This does not seem to be a justifiable excuse, for if the clinician is good enough to refer his patients to them, laboratories and institutions should assume the responsibility of providing space for the storage of the films. If this should become a physical impossibility, most certainly the patient's physician should be informed when films are to be destroyed so that he may collect those he desires to preserve.

When the clinician asks to borrow films of his patients from laboratories or hospitals he is required to sign for them and he is urged to return them promptly. If they are not returned in due time, he is harassed until they are, but when the time comes for the disposal of these films, he is ignored.

Most of our sanatoriums and hospitals for chest diseases have carefully preserved their films, since these are a great asset to the institution and to the physicians whom they serve. Some of them have found it necessary to construct special storage space, which is laudable. In some institutions where storage space has become a serious problem, reductions have been made of the original films, in an attempt to preserve the record. Some have been recorded on 35 millimeter film and others on 4 by 5 inch film. While this is better than destroying the record entirely, it is not satisfactory, for these reductions are difficult to view and there is the danger of losing detail of shadow.

Every X-ray laboratory and hospital should preserve all chest films for the lifetime of the patient, after which they should be transferred to the clinician for any future use he desires to make of them. If this is not possible, such films should be submitted to the clinician soon after they are made.

J. A. M.

INFINITE PATIENCE

Twenty-six years ago, this very month, three members of the Medical Reserve Corps, First Lieutenants Colvin and Armstrong from St. Paul and one from Minneapolis were ordered on active duty at Fort Snelling as examiners of organized militia.

Newspapers headlined Villa's depredations on the Mexican border; Black Jack Pershing had been assigned to the task of quelling his lawless bands and avenging their excursions across the Rio Grande. The need of haste in a critical situation was played up. The air was filled with conflicting rumors and officers were daily beset by news-hawks, anxious for priorities on expected troop movements. Major Pyle arrived from Jefferson Barracks and coolly explained that the National Guards could not be taken out of the state until they had been inducted into federal service, and this could only be done after examination by regular army officers.

There were only three to do this job. Requirements were far more strict then than during the World War two years later, and we did not have the system that prevails today; so, in spite of a noble desire to complete the work in the shortest possible time, it was found that this laudable effort had its limitations.

At the crack of dawn examinations were carried on at terrific speed, but by night the men presenting themselves began to look very much alike and it was conceded that patriotic zeal was no adequate substitute for much needed sleep in this exacting work.

It was during times like this that Major Pyle showed how army officers had to adjust themselves to trying circumstances in the midst of an atmosphere of excitement and confusion. Scarcely had the first day's examinations gotten well under way when word came that a captain of the line had suffered some acute attack, while in the neighborhood of the Northwestern Hospital in Minneapolis, and been put to bed. He requested the attendance of a medical officer from the Fort and the commandant directed Major Pyle to proceed at once. Physical examinations at the Fort were abruptly terminated for the period required to drive to Minneapolis, give the captain a placebo and return. On the way to the hospital the Major was manifestly annoyed at the interruption, but said there was nothing else to do; we had to obey orders and exercise infinite patience. On the way back, after finding no pathology, he was ready to explode, but concluded again with those two magic words—infinite patience! The saving grace of this little couplet is apparent to every physician whose many trying ordeals must of necessity be faced with equanimity.

A son was born to one of those reserve officers while he was stationed there and when that baby was inducted into the service this year, at the same place and shipped to Jefferson Barracks, his dad told him this narrative in the hope that it might prove helpful in negotiating rough places here and there.

A. E. H.

Book Reviews

Textbook of Surgery, by American Authors, edited by Frederick Christopher, M.D.; edition 3. Philadelphia: W. B. Saunders Company, 1942. Price $10.00.

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The third edition of this admirable textbook brings up to date a concensus and summary of contemporary American surgery. The book is 1718 pages and contains 1538 illustrations. It is written by 195 separate authors, all of whom are leaders in their respective fields. There are 40 chapters, each covering a separate subject of surgery. Several chapters deal with general basic principles of surgery. The newer material on chemotherapy and the subject of war wounds are included. Anesthesia, pre- and postoperative care are adequately covered. Stress is laid on the Orr-Trueta method of treating fresh war injuries.

Textbook of Surgery is an ideal reference book for the medical student and practitioner who must refer to a surgical text, as almost every conceivable surgical condition is included. At the end of each chapter there is added an excellent reference list for further detailed study.

News Items

Seven North Dakota medical school graduates were granted licenses to practice medicine and surgery in the state by the state board of medical examiners recently. Awarded licenses were Robert E. Mattison and Malcolm A. McCannel of Minot, William R. Fox of San Haven, Ernesto Salomone of Elgin, William Wood of Jamestown, Charles Heilman and M. Stuart Grove of Fargo. Medical examiners board officers are Drs. P. H. Burton of Fargo, president; G. M. Williamson of Grand Forks, secretary-treasurer and general administrative officer, and H. A. Bronson of Grand Forks, general counsel. Other board members are Drs. W. C. Fawcett of Starkweather, W. A. Gerrish of Jamestown, C. J. Glaspel of Grafton, A. D. McCannel of Minot, C. W. Schoregge of Bismarck, W. F. Sihler of Devils Lake, and W. A. Wright of Williston.

New officers of the Montana State Medical Association are: Dr. J. P. Ritchey, Missoula, president-elect; Dr. A. C. Knight, Philipsburg, vice-president; and Dr. Thomas F. Walker, Great Falls, secretary-treasurer, who was reëlected. Councilors are: Dr. Charles Houtz, Havre; Dr. A. R. Foss, Missoula; Dr. J. H. Irwin, Great Falls; Dr. John Garberson, Miles City; Dr. A. E. Wilden, Lewistown; and Dr. L. W. Allard, Billings. Billings has been selected as the place for the 1943 meeting of the Montana State Medical Association.

Dr. A. D. McCannel of Minot is the new president of the North Dakota State Board of Medical Examiners.

Dr. Bernard Nauth has joined the staff of the Winona (Minnesota) Clinic.

Dr. Howard W. K. Zellhoefer, Sioux Falls, South Dakota, has been promoted from major to lieutenant-colonel in the medical corps of the United States Army. He has been on active duty since May, 1941.

Dr. F. H. Rosenthal, Grand Meadow, Minnesota, is now in the medical corps of the United States Army.

Dr. Robert S. Hunt and Dr. Robert Bailey, of Fairmont, Minnesota, have been commissioned as lieutenants in the Army medical corps.

Dr. R. N. Bowers, Mazeppa, Minnesota, has joined the United States Army medical corps.

Dr. P. J. Pankratz, Mountain Lake, Minnesota, has been commissioned as officer in the Army medical corps.

Dr. R. A. Glabe has become a lieutenant in the United States Navy.

Dr. F. H. Redewill, Rapid City, South Dakota, has been named public health officer for Fall River and Custer counties.

Dr. Robert M. Foote, Fargo, North Dakota, has received an active commission as assistant surgeon in the United States Public Health Service and is located at Fort Worth, Texas.

Dr. Otis Marsh who has been associated with Dr. W. E. Macklin in Litchfield, Minnesota, the past few months, has been called to active duty in the Army medical corps.

A free clinic for the administration of immunization serum for typhoid fever, smallpox, and diphtheria, was held in Custer, South Dakota, recently. Dr. Hamilton Redewill was in charge.

Dr. H. R. Rice, Roseau, Minnesota, has joined the Navy medical corps as lieutenant-commander.

Dr. W. N. Freeman, Perham, Minnesota, has been commissioned a first lieutenant in the Army medical corps.

Dr. Luther Davis, Wadena, has reported for duty in the Army medical corps at Fort Douglas, Utah. He is a first lieutenant.

Tribute was paid to Dr. Christopher Graham, 86, of Rochester, Minnesota, recently at the annual B. P. O. Elks dinner which is given in honor of an outstanding citizen. Dr. Robert D. Mussey, chairman of the board of governors of the Mayo Clinic and former associate of Dr. Graham, was the principal speaker. Dr. Graham, the first intern at St. Mary's hospital, Rochester, in 1895, has been a physician, agriculturist, stock breeder, and civic leader.

Dr. C. D. McKinney, district surgeon for the CCC headquarters at Fort Missoula, Montana, has joined the United States Army medical corps.

Dr. LaMeta Dahl, who recently completed her internship at Trinity hospital, Minot, North Dakota, is now resident physician at Children's Hospital, Denver, Colorado.

Dr. Robert E. Walker has taken over the practice of Dr. G. A. Townsend in Livingston, Montana. Dr. Townsend is devoting full time to his hospital at Chico Hot Springs.

Dr. L. E. Sjostrom, who has practiced in Stolden, Minnesota, since 1936, has joined the medical corps of the United States Army.

Dr. R. Sidney Hamilton, Great Falls, Montana, commanding officer of a station hospital with the Army medical corps overseas, has been promoted to the rank of major.

Dr. A. A. Schmitz, formerly of the Mesaba Clinic, Hibbing, Minnesota, has joined the staff of the Mankato Clinic.

Commander W. McK. Craig, Rochester, Minnesota, has been appointed chief of neuro-surgery in the Naval Hospital at the National Naval Medical Center in Bethesda, Maryland.

Dr. Herman Kabat, University of Minnesota physiologist, has been granted $10,700 to continue research on infantile paralysis. National Foundation for Infantile Paralysis announced the grant last month; it will enable Dr. Kabat to continue his studies of the chemical changes which the disease causes in the spinal cord.

The
JOURNAL
LANCET

Minneapolis, Minnesota
September, 1942

Vol. LXII, No. 9
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Transactions of the North Dakota State Medical Association

Fifty-Fifth Annual Session

Jamestown, North Dakota

May 18, 19, 20, 1942

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(1942)

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C. J. GLASPEL, M.D.	Grafton
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A. R. SORENSON, M.D.	Minot
FRANK I. DARROW, M.D.	Fargo

PROCEEDINGS
of the
HOUSE OF DELEGATES
FIFTY-FIFTH ANNUAL MEETING
of the
NORTH DAKOTA STATE MEDICAL ASSOCIATION

Jamestown, North Dakota
Monday, May 18, 1942

FIRST MEETING

The House of Delegates convened in the main dining room of the Hotel Gladstone, Jamestown, North Dakota, and was called to order at 2:20 P. M. by the Speaker, Dr. John H. Moore.

Preliminary Report of the Committee on Credentials

Dr. Olaf Haraldson, Minot, chairman of the Committee on Credentials, announced that sixteen delegates and three alternates with proper credentials had registered.

Roll Call

The Secretary called the roll; nineteen delegates and alternates responded, and the Speaker declared a quorum present. Those present were:

Doctors:

G. W. Hunter, Fargo.
W. E. G. Lancaster, Fargo.
Carl Elofson, alternate, Fargo.
Josephine Stickelberger, Oberon.
P. H. Woutat, Grand Forks.
C. J. Glaspel, alternate, Grafton.
W. A. Wright, Williston.
Olaf Haraldson, Minot.
A. R. Sorenson, Minot.
A. H. Reiswig, Wahpeton.
Wm. Campbell, Valley City.
R. H. Waldschmidt, Bismarck.
O. T. Benson, Glen Ullin.
C. C. Smith, Mandan.
J. P. Merrett, Marion.
A. P. Nachtwey, Dickinson.
T. L. DePuy, Jamestown.
H. A. LaFleur, alternate, Mayville.
A. E. Westervelt, Bowdon.

Adoption of Minutes of 1941 Grand Forks Session

On motion of Dr. R. H. Waldschmidt, Bismarck, seconded by Dr. P. H. Woutat, Grand Forks, and carried, the House dispensed with the reading of the Minutes and adopted the Minutes as published in the August, 1941, issue of the Journal-Lancet and circulated.

Communication from State Defense Council

The following communication from the State Defense Council was read by the Secretary and referred to the Reference Committee on Reports of the Secretary and Special Committee.

"Gentlemen: It is our understanding that to date no provisions have been made for the establishment of liquid blood plasma service on a statewide basis. Blood collection centers and a central distribution depot constitute an important phase of the Civilian Defense program and supplements the Red Cross donor service in cases of unexpected emergencies of the future.

The demands upon the Red Cross Service for plasma have been greatly exceeding the supply. Their supply is all needed by the Army and Navy. There is no surplus or reserve for civilian areas which may be subjected to disaster.

We cannot hope to have the Red Cross or other agencies supply our needs for Civilian Defense. It would be desirable to have a statewide plan for collection and distribution of liquid plasma functioning smoothly before an actual emergency arises in our own state, and should the Red Cross and other agencies be unable to supply the full quota required by the armed forces, states having reserve supplies of plasma will be requested to supplement the Red Cross supply.

After careful consideration it is our conviction that the Medical Profession of the State of North Dakota is the most logical and best equipped group in the state to organize a plan for the establishment of a liquid blood plasma service for Civilian Defense in North Dakota.

We are certain that the relatives and friends of thousands of North Dakotans in the service will respond most enthusiastically to a plea to donate their blood to such a cause, if the plan is devised by and has the wholehearted support of the Medical Profession of North Dakota.

Sincerely yours,
Chairman, State Defense Council,
by L. R. Baird, Executive Officer."

REPORTS OF OFFICERS

Report of the Secretary

Dr. L. W. Larson, Secretary, presented the following report which was referred to the Reference Committee on Reports of the Secretary and Special Committees.

Secretary's Report

L. W. Larson, M.D.

The total membership for 1941 was 400. Of this number, 374 were paid-up members, 12 were Honorary members, and the dues of 14 were cancelled because of military service. Table No. 1 shows the membership figures for 1939, 1940 and 1941. Note how the membership remained stationary during these years. New memberships and renewal of old memberships have offset the loss incident to death, removal from the state, and failure to pay dues.

TABLE No. 1
Comparison of Membership in 1939, 1940, and 1941.

	1939	1940	1941
Paid Memberships	394	387	374
Honorary Memberships	3	11	12
Dues cancelled, military service			14
Total	397	398	400

The total membership for 1942 on May 5th is 393. Of these 352 have paid their dues, 10 are Honorary members and 31 are in the Military Service. A year ago the membership on the same date was 351 (see Table No. 2). The increase is due to fewer delinquents, the admission of 13 new members, and the reinstatement of 3 members.

TABLE No. 2
Comparison of Membership on May 5, 1941 and 1942.

	1941	1942
Paid-up Members	339	352
Honorary Members	12	10
Dues cancelled, military service		31
Total	351	393

It seems evident that the increase in dues from $5.00 to $10.00 in 1940 has not affected the total membership adversely. At the present writing, there are only 10 who are delinquent in the payment of their 1942 dues. There were several times this number last year.

New Members. About 80 per cent of the profession in North Dakota belongs to the State Association. This is a high figure compared with most states. Numerous surveys agree that the majority of non-members in our state have either consistently refused to join or are not considered suitable by their fellow practitioners for membership. We must continue to encourage the young men who settle here to join our Association. We need them and they need us.

Field Work. Because of greatly increased demands upon my time as a result of extraordinary activities incident to the Chairmanship of the Committee on Medical Preparedness, it has been impossible for me to visit every society in the state. However, I cannot refrain from stating that my offer to visit the smaller district societies produced little response. I hope that this is to be explained by the excellent condition of the smaller societies.

Extraordinary activities of the Secretary's office. The routine correspondence in the office continues to increase. Requests for information from individuals and organizations arrive daily. These must be answered. The work of the Committee on Medical Preparedness, especially since the Procurement and Assignment Service was established last fall has required a large amount of correspondence and clerical help. In addition, your secretary has been required to travel a great deal to points within the state as well as to Chicago and Omaha, in connection with his duties as State Chairman for the Procurement and Assignment Service. As a result, there has been no time for expansion of the ordinary duties incident to the secretaryship.

Standing Committees. The reports of these committees can be found elsewhere in the Handbook. They represent the efforts of many of our members to solve important problems of interest to our profession and the people of our state.

Members in Military Service. According to our records, 33 of our members are now in the armed forces. This is a large number when we consider the comparative scarcity of physicians in North Dakota. Our civilian population must have essential medical care. The Government has promised that this will be provided and the Procurement and Assignment Service was created to insure this principle.

I am grateful to the officers and Council of the State Association, the officers of the District Societies, and the Chairmen of the various committees, for the coöperation they have given me during the past year.

Signed: L. W. Larson, M.D., *Secretary.*

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Dr. Larson reported that 357 1942-43 memberships had been paid as of May 16, 1942.

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Dr. N. O. Ramstad, chairman, presented the following report of the Council which was referred to the Committee on the Reports of the Council, Councillors, and Delegate to the American Medical Association.

Report of the Chairman of the Council of the House of Delegates—1941-1942

The Council of the North Dakota State Medical Association has had no mid-year or special meetings during the past year.

At the meeting May 19, 1941, Councillors M. MacGregor and P. G. Arzt were absent. Dr. P. H. Burton of Fargo and Dr. W. W. Wood of Jamestown were appointed to act in their places.

The following report is abstracted from the records of Dr. Geo. M. Williamson, secretary of the Council:

President C. J. Glaspel and Secretary L. W. Larson met with the Council. President Glaspel reviewed the membership problem and suggested that an effort be made to increase the membership in the State Association. Various methods were discussed to bring this about. It was decided to have the state secretary communicate with non-members and to ask the aid of the Councillors and the secretaries of the local societies. Dr. L. W. Larson gave a report of his many activities as secretary of the Association. The National Preparedness Program has greatly increased his work.

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Comment was made regarding the lack of local medical news in the Journal-Lancet. Local secretaries were requested to send all news items to Secretary L. W. Larson who will edit the same and forward them to the Journal-Lancet.

A committee was appointed to interview Dr. James Grassick to try to obtain his consent to have his Christmas Greetings published in book form. The committee conferred with Dr. Grassick and he informed the committee that he was considering a plan for editing and publishing these greetings.

Secretary Larson reported the membership in the State Association as 346.

It was decided to procure a charter for each district society and that $44.00 be appropriated to pay for the frames and charter.

Secretary Larson and Treasurer Wood were appointed a committee for planning a more efficient method for issuing vouchers and for paying the same.

Arrangements were made to obtain a bond for the Treasurer and the Secretary as provided for by the Constitution.

It was moved and carried that members of the State Association who have been called into the service of the United States Army or Navy be carried on the active list of members without payment of dues until they resume private practice.

It was moved and carried that the Journal-Lancet not be sent to men in active service because of their frequent change of address.

The cost of broadcasting Dr. Fishbein's speech, amounting to $30.00, was allowed.

Drs. Long, Benwell, J. O. Arnson, and Toomey were named to the Board of Editors of the Journal-Lancet, and a committee was appointed to approve publications in the Journal-Lancet from this Association.

Signed: N. O. Ramstad, M.D.,
Chairman of the Council.

REPORTS OF COUNCILLORS

First District

The Cass County Medical Society has 56 paid-up members. Two Honorary members, Dr. J. P. Aylen and Dr. T. C. Patterson; and five in military service, Drs. George Schatz, George Ivers, Ira Clark Jr., J. R. Dillard, J. O. Sigurdsson; and six probationary members.

Monthly dinner meetings have been held from September, 1941, to April, 1942. All programs have been presented by our members except one. Dr. F. A. Willius of Rochester, Minnesota, addressed the society on Heart Disease. Dr. L. W. Larson, our State Secretary, gave a talk on the Doctor in the War Effort, and procurement of doctors for service in the war.

Our society and members have given full coöperation to the Government in the Selective Service Program.

Signed: P. H. Burton, M.D.,
Councillor, First District.

Second District

The Devils Lake District Medical Society has held four meetings, all at Devils Lake. At present we have twenty-eight members, all in good standing.

At the October meeting a committee for the local American Legion Post talked to the society regarding the purchase of an Iron Lung by public subscription. Our society donated $75.00 towards the fund. Dr. Maysil M. Williams gave a fine talk on the Encephalitis Epidemic.

At the last meeting we discussed the requirements of Nurses Training Courses as related to the small hospital. The subject of a new fee bill was under discussion at this meeting. In our district, the Welfare Board of some of the counties persist in pro-rating money to the medical profession. This we protest but have failed so far to find a remedy for it.

Our meetings have been well attended as well as being interesting. We have no dissension in our society.

Signed: W. C. Fawcett, M.D.,
Councillor, Second District.

Third District

The Grand Forks District Medical Society meets regularly each month from September to April, inclusive.

The programs for the past year have been interesting and highly instructive. The attendance has been good.

The September meeting is always held at Grafton, the speaker usually comes from Winnipeg and there is a large attendance. Other guest speakers, from Minneapolis, have discussed practical subjects in an interesting and instructive manner. Local members have presented symposiums on various subjects which have proven highly interesting. The past year has been successful.

Five members of this society are at present serving in the Army, namely: Drs. Griffin, Mahowald, Ransom, Robertson and Vollmer.

We have lost by death Dr. W. W. McQueen, Langdon; Dr. C. B. Harris, Pembina, and Dr. J. M. Hofto, Grand Forks.

There are 59 men in active practice in this district, 5 on the retired list — 63 in all.

I suggest that the boundaries of this district be rearranged; automobile roads make better boundaries than county lines—this may well apply to the boundaries for all societies. State Road No. 1 would make a good western boundary for this society; there are seven men in towns west of that road near Devils Lake. Some of them have membership in that society because it is more convenient. I would also suggest that since Traill-Steele County Society has been attached to this Councillor district, that said society give up its charter and unite with the Grand Forks district. There are ten men practicing in Traill-Steele counties, eight of whom are members of the society, the other two will become members soon.

I had the pleasure of attending a meeting at Mayville accompanied by Professor Coons of the State Public Health Laboratory, University, during November. I enjoyed that meeting, practically all members were present; they are splendid entertainers, and we had an enjoyable evening. However, on account of the small membership, I think it would be advantageous to all to be members of a larger society, enjoy programs furnished by men from teaching centers and have a part in the discussion of subjects presented. A healthy spirit prevails in both societies in this Councillor district.

Signed: G. M. WILLIAMSON, M.D.,
Councillor, Third District.

Fourth District

The Northwest District Medical Society has had a good year. We have a paid-up membership of sixty-one, with two honorary members: Drs. Andrew Carr of Minot and John F. Timm of Makoti.

There have been ten regular meetings and one special meeting. The average attendance was thirty-three.

Some of the highlights of the programs through the year were: Dr. Carl Rice of the University of Minnesota, who talked on "Fractures of the Tibia and Fibula." Major Radl of Bismarck discussed "Certain Phases of the Selective Service Program," and at the same meeting Dr. H. A. Carlson of Minot presented a paper on "A Case of Lobectomy." Dr. Cedric Northrop of the State Sanatorium discussed "Differential Diagnosis of Hemoptysis," and Dr. F. J. Hill of Bismarck talked on "Immunological Aspects of Tuberculosis." Dr. Hill is with the Public Health Department. A very interesting film on "Cholecystectomy" was shown, followed by a discussion. Dr. John E. Faber of the University of Minnesota recently visited us and discussed "Certain Aspects of Gynecology." Our meetings are held alternately at St. Joseph's and Trinity hospitals.

In July and August we had two very enjoyable picnics at the Minot Country Club. At these meetings there were no scientific discussions.

The following members have entered military service: Dr. J. L. Devine, Jr. (Army), Dr. William Durnin of Bottineau (Army), Dr. Chris Johnson of Rugby (Army), and Dr. Donald J. Cronin of Minot (Navy).

Several of our members have taken advantage of the refresher courses at the University of Minnesota; Pediatrics, Dr. M. W. Garrison and Dr. Fred Erenfeld; Obstetrics, Dr. D. J. Halliday and Dr. C. M. Kelsey; Venereal Disease, Dr. Rolletson and Dr. Flath; X-ray, Dr. Woodrow Nelson and Dr. M. W. Garrison.

Economic conditions in the Northwest District were much improved the past year, and all of the members were happy to be relieved of the unnecessary governmental medical organizations, several of which had been tried out for the benefit of the low-income group.

Officers elected for the coming year are: Dr. M. T. Lampert, president; Dr. G. S. Seiffert, vice-president, and Dr. Woodrow Nelson, secretary.

Signed: ARCHIE D. MCCANNEL, M.D.,
Councillor, Fourth District.

Fifth District

The Sheyenne Valley Medical Society has a membership of fourteen — one less than last year. This loss was sustained by reason of a call to active service of Reservist G. A. Dodds, M.D.

Four regular meetings have been held.

Topics of interest receiving the attention of the society are as follows:

Study and adoption of a new Constitution and By-laws for the society. Study and rejection of FSA plans for hospitalization and medical care. Study of a Fee Schedule. No definite action has resulted as yet.

The annual meeting of the society was held January 23rd—a banquet meeting and with nearly perfect attendance.

Two well prepared addresses were presented, one on Pediatrics by Dr. Paul Cook and the other on the Kenney Treatment of Infantile Paralysis by Dr. William Campbell. Thus the society became a beneficiary from attendance by these men of graduate instruction at the University of Minnesota.

The following doctors were elected to office: President, Fred Brown, M.D., Valley City; vice-president, L. Almklov, M.D., Cooperstown; secretary-treasurer, C. J. Meredith, M.D., Valley City; delegate, Wm. Campbell, M.D., Valley City; alternate delegate, M. D. Westley, M.D., Cooperstown.

Signed: F. L. WICKS, M.D.,
Councillor, Fifth District.

Sixth District

At the present time we have 65 members in good standing. Seven of them are in the Army or in the Navy.

During the year we have held four meetings with an average attendance of 35.

In September Dr. W. H. Bodenstab gave a paper on Workmen's Compensation rates, which was very helpful and instructive to us all. Dr. S. N. Maxeiner of Minneapolis spoke to us about the treatment of fractures and reviewed the treatment of many difficult and complicated types of fracture which was based on his own experiences.

In December Dr. J. O. Arnson discussed arteriosclerotic heart disease. Dr. N. O. Ramstad gave a paper on "Surgery of the Vascular System."

The February meeting was devoted to eye, ear, nose and throat conditions and papers were presented by Dr. H. P. Rosenberger, Dr. E. D. Perrin, Dr. W. L. Diven and Dr. R. H. Breslin.

At the April meeting Dr. A. M. Brandt reported on the pediatric course recently given at the University of Minnesota. Dr. C. A. Baumgartner read a paper on "Vomiting in Infancy." Dr. H. A. Wheeler presented some ingenious homemade equipment which appeared to be useful and practical.

During the year Dr. D. T. Weston of Mandan moved to Santa Monica, California, and transferred his membership.

Members admitted during the year are: Dr. M. M. Heffron from the Southwestern district at Dickinson, Dr. K. R. E. Linker, Goodrich, Dr. R. H. Breslin of Mandan, Dr. O. M. DeMoully of Flasher, and Dr. A. J. Swingle of Mandan.

We made a special effort during the year to bring in to membership men who, for some reason or other, have not belonged to the local and state societies for some time.

We lost a member in the death of Dr. L. G. Smith of Mandan, who died following an automobile accident. Dr. Smith specialized in eye, ear, nose and throat practice in Mandan and had been an active member of our society for many years.

The affairs of the society have been well conducted in a business-like manner, and harmony and coöperation have prevailed among our members.

Signed: N. O. RAMSTAD, M.D.,
Councillor, Sixth District.

Seventh District

Four dinner meetings were held during 1942 at which there was a good average attendance and interesting discussions of the papers presented.

1. Dr. R. D. Nierling, "Harrison Narcotic Law."
2. Mr. Kline, "Blue Cross Hospital Insurance."
3. Dr. L. W. Larson, "Rehabilitation."
4. Dr. E. J. Kepler, Mayo Clinic, "Internal Glandular Problems."

There are twenty-one members, and one of our members Dr. R. D. Nierling, is in the Service. The society is in good financial condition; the membership active; peace and harmony prevails at all times.

Signed: P. G. ARZT, M.D.,
Councillor, Seventh District.

Eighth District

On the evening of November 13, 1941, the Southern District Medical Society met at Kulm to do honor and recognize Dr. Fred Fergusson as being president-elect of the North Dakota Medical Association for 1942.

Those present were: Dr. Fred Fergusson, Dr. Victor Fergusson, Dr. G. B. Ribble, Dr. Roy Lynde, Dr. H. J. Meunier, Dr. F. E. Wolfe and Dr. Owen King of Aberdeen, and several doctors from Jamestown.

A steak dinner was enjoyed at the Central Cafe and a check for $9.74 was issued from the society funds for the same.

Dr. Owen King then presented a moving picture film of the treatment of broken hips by the nailing procedure. Later he showed X-ray films of the broken hip. A discussion followed.

It was decided to hold the next meeting at Oakes.

Signed: G. B. RIBBLE, M.D.,
Councillor, Eighth District.

Ninth District

(No Report).

Tenth District

The Southwestern District has again had a successful year. We have held three regular meetings, all of which have been well attended, and the fourth meeting is scheduled for April 14th.

At the meeting of November 22nd, we were treated to a very interesting and instructive talk on "The Diagnosis and Treatment of Common Allergic Manifestations Encountered by the General Practitioner" by Dr. Wayne M. Hull of the Balyeat Clinic of Oklahoma City. This talk was illustrated by lantern slides and was greatly enjoyed by all.

Speakers at the other meetings have been members of our own society. We have, to date, 14 paid-up members but expect this number to be increased before the meeting of the Medical Society. Officers for the year are: Drs. E. L. Bloedau, Bowman, president; Oscar Smith, Killdeer, vice-president; H. L. Reichert, Dickinson, secretary-treasurer; A. P. Nachtwey, Dickinson, delegate, and R. W. Rodgers, Dickinson, alternate.

Signed: A. E. SPEAR, M.D.,
Councillor, Tenth District.

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Dr. W. W. Wood, Treasurer, announced that his report could be found in the Hand-Book Report of the Council. As a supplementary report, he announced that he had received $580.00 since April 1st for 1942-43 dues.

REPORTS OF STANDING COMMITTEES

The following reports of Standing Committees, as printed in the Hand-Book, were referred to the Reference Committee on Reports of Standing Committees.

Committee on Medical Education

Your Committee on Medical Education has kept in contact with each other in the case of a few but personal conversations and in the case of others by correspondence. You are familiar with the general plan and organization of the school, its history and its difficulties of the last eight years, growing out of inadequate support. The support has been somewhat better for the last few years and many improvements have been made in library, equipment and in number of the faculty. The school continues to operate with the same good quality of students who are in general in demand for admission with advanced standing in other schools when they complete their work here. All members of the class of 1941 who sought admission in other schools were accepted in such schools and are continuing their clinical training.

This year we have twenty-six students in each of our two classes. At the present time twenty-three of the twenty-six members in the second year class have been accepted in other schools for advanced standing. Several of the class that finished in 1941 elected to write upon Part I of the National Board in June or September of last year. The results were as always gratifying. Incidentally, it might be said that over fifty "graduates" of the school are now licentiates of the National Board of Medical Examiners.

Signed: H. E. FRENCH, M.D.,
Chairman.

Committee on Necrology and Medical History

In accordance with the traditions of our profession, we pause in the midst of our labor to pay our tribute of memory to those of our members who, since our last Annual Session, have gone the way whence they shall not return.

To those who mourn their passing we extend our deepest sympathy, coupled with the thought that their lives were devoted to the relief of human needs, and of such the Master said: "Well done, thou good and faithful servant."

LEROY G. SMITH

Dr. L. G. Smith of Mandan, North Dakota, was born at Woodland, Michigan, July, 1887, son of Rev. and Mrs. John M. Smith of that city, and died as the result of an accident July 9, 1941, while on his way to accept an appointment as C.C.C. camp physician at Custer, South Dakota.

He graduated in Medicine from Saginaw Medical College in 1901 and later took graduate studies in Chicago, and was licensed in North Dakota, 1906. He began practice at Holland, Michigan, and then came to North Dakota, practicing at Beulah, Medina and Jamestown, and later at Mandan where he remained until 1941. He was a former member of the medical firm of Smith, Weston and Smith, and specialized in eye, ear, nose and throat conditions.

He was socially-minded and interested in community, church and fraternal activities, as well as in local, state and national medical organizations. His wife and two sons survive.

WILLIAM WRIGHT McQUEEN

Dr. W. W. McQueen was born at Alora, Ontario, November 17, 1863, and died at his home in Langdon, North Dakota, July 29, 1941.

He was a graduate of Trinity Medical College, Toronto, Ontario, and began the practice of his profession in 1894 at Milton, North Dakota, and moved to Langdon in 1903, where he remained until his death.

Dr. McQueen came to our state in the "Horse and Buggy Days" and at the call of duty followed winding prairie trails in summers' scorching suns and winters' biting snow, giving the best he had of skill, care and counsel, to his patients. He was a fine type of the family physician, well trained, considerate and dependable.

Dr. McQueen was public-spirited and gave freely of time and means for community welfare. He was an active and consistent church worker and served for 38 years as an adult Bible Class Teacher in the church of his choice.

Dr. McQueen will be missed as an honored member of his profession, ethical and efficient, as a loyal citizen of state and nation and as a fine, honorable, clean-cut and consistent Christian gentleman.

JALMAR M. HOFTO

Dr. J. M. Hofto was born May 28, 1897, in Crookston, Minnesota, and died after a brief illness at his home in Grand Forks, North Dakota, August 26, 1941. He was a graduate of the University of North Dakota and of Rush Medical College, Chicago.

He enrolled in the S. A. T. Company at the University of North Dakota and later went to the Central Officers Training School at Camp Grant, Illinois, where he remained until discharged December 4, 1918. He was licensed in North Dakota in 1924 and began practice at Larimore; later, he practiced at Ray, North Dakota, and for the past ten years at Grand Forks.

Dr. Hofto was one of our younger practitioners, well trained and progressive.

He leaves a wife and two children to mourn his passing.

CHARLES BOARDMAN HARRIS

Dr. C. B. Harris was born at Martinsburg, West Virginia, November 6, 1857, and died at his home at Pembina, North Dakota, January 2, 1942.

He graduated from the College of Physicians and Surgeons, Baltimore, Maryland, March 3, 1880, and began practice in his native city, where he remained for two years.

Hearkening to the call of the West, he came to the Territory of Dakota and settled at Pembina, on its northern boundary, March 11, 1882, where he made his home and did his days' work; and at the time of his death was the oldest physician in point of service in the state and the 41st to register in the Territory.

Dr. Harris was of English ancestry who came to Virginia in early Colonial days and was the grandson of Rear Admiral Charles Boardman, after whom he was named.

Dr. Harris was a fine representative of the early pioneer physician, serving an area that included parts of Manitoba, Dakota and Minnesota, of whom the late Dr. V. C. Stickney so aptly wrote, "The men who first set up the standard of medicine in the Northwest had all the qualities and traditions of the pioneer—the spirit of adventure, the love of romance, the joyous response to the things that draw red-blooded men to the lonely places of the earth." Dr. Harris could qualify as worthy of them all. In addition to his work as a physician, he served his country well in various positions of trust and responsibility.

He was a soldier of the common weal and served on the firing line as faithfully in lean years as in those when the going was easier, and through it all he carried on as an unassuming Christian gentleman.

He leaves an honorable record in professional, civic and family life.

His passing was like a leaf in Autumn—full-tinted and ripe, that gradually loosened its grip on parent stem and gracefully and peacefully floated away to rest on the bosom of the Mother of us all.

CHARLES A. DURKEE

Dr. C. A. Durkee was born in Michigan state in 1880 and died at Fargo, North Dakota, February 19, 1942.

While a boy, he moved with his family to Frederick, South Dakota, and was there reared to manhood.

He received his medical education at the College of Physicians and Surgeons, Chicago, Ill., graduating in 1908. He was licensed in North Dakota the same year and practiced his profession at Morton, Lidgerwood and Fairmont before moving to Abercrombie where he remained for the past six years.

Dr. Durkee was held in high esteem by those he so unselfishly and skilfully served.

He leaves a widow, two sons and a daughter to mourn his passing, to whom the sympathy of his fellows is extended.

ARTHUR PEAKE

Dr. A. Peake, a resident physician of Valley City for the past 20 years, passed away at his home there, having completed his three score and ten years, and was laid to rest February 14, 1942, Rev. C. L. Wallace of Mandan officiating.

Dr. A. Peake graduated from Hering Medical College in 1899 and was licensed in North Dakota the following year. He practiced at several places and was, at one time, associated with his brother, Dr. Francis Peake, now of Jamestown.

WILLIAM R. SHORTRIDGE

Dr. W. R. Shortridge was born at La Plata, Mo., December 14, 1867, and died in a Bismarck, North Dakota, hospital March 16, 1942.

He received his education at La Plata public schools, the Missouri State Normal School and the Keokuk Medical College, and was licensed in North Dakota in 1906.

He practiced for six years at Greenville, Iowa, and then came to North Dakota and located at Flasher where he remained and made his home since that time.

Dr. Shortridge was a man of the frontier and the wide open spaces and was at one time the only resident physician between Mandan, North Dakota, and Deadwood, South Dakota. From this we may judge of the territory he covered, the difficulties he encountered and the hardships he endured, but that was all in the day's work.

Surviving are his widow, a son and a daughter.

He was buried from the Congregational Church at Flasher, of which he was a member.

JAMES PRENTISS AYLEN

Dr. J. P. Aylen was born at Aylmer, Quebec, September 5, 1863, and passed away at St. John's Hospital, Fargo, North Dakota, April 29, 1942.

He received his medical education at McGill University, Montreal, and at Belleview Medical College, New York, where he graduated March 12, 1888. He was licensed the same year in the Territory of Dakota and began the practice of medicine at Sheldon where he remained for nineteen years.

Dr. Aylen from the first took an active interest in Organized Medicine and in 1896 was elected president of the North Dakota Medical Association. In 1907 he was made chief surgeon of the Northern Pacific Railway Hospital at Missoula, Montana, where he remained until December 12, 1912. Since that time his home was in Fargo, where he was local surgeon for the Great Northern and the Chicago and St. Paul Railways, and consulting surgeon for the Northern Pacific Railway.

Dr. Aylen held many positions of honor and trust, such as county physician, mayor, member of the state board of medical examiners; member of the executive staff of St. John's Hospital, Fargo; superintendent of the state school at Grafton, 1933-37, and during the first World War served in the Army as chief surgeon aboard the Leviathan and held the rank of Major. He was also a member of the first class given fellowships in the American College of Physicians and Surgeons.

Dr. Aylen was one of the Old Guard who came in Territorial days and, through the years, held aloft the torch of medical standards and ethics.

He is survived by an only son, Walter O. Aylen, who is a practicing physician of Auburn, Washington.

Dr. Aylen was a born leader and would have been a man among men wherever he happened to be. His endearing social qualities made him a welcome guest at all medical gatherings. He was a genial companion; an honorable associate; a capable and ethical practitioner and a staunch friend.

Would there were songs to praise such men in full
Who mend our bodies, rid our minds of strife.

GEORGE McINTYRE

Dr. George McIntyre was born of Scottish parents at Ancaster, Wentworth county, Ontario, December 31, 1861, and died at San Marino, California, May 3, 1942.

He received his early education in the public schools of his native province and graduated from the Medical Department of the University of Michigan at Ann Arbor, June, 1887, and was licensed in Dakota Territory the following year.

He practiced alternately at Buxton, Hillsboro and Mayville, in all—forty years, then moved to Minneapolis, Minnesota. His later years were spent in California. Dr. McIntyre was a pioneer in X-ray work, at a time when little was known of its powers for good or ill; and received a "burn" that refused to heal, and, later, became malignant, necessitating the amputation of a hand; and metastases did the rest—a martyr to Science!

He was connected with the North Dakota Medical Association from its first and in 1889 was elected as its secretary, and in the following year was on its annual program for a paper. In 1908, he was a delegate to the National Legislative Council and later was elected to affiliated membership in the American Medical Association. Dr. McIntyre was a typical representative of the pioneer—young, vigorous and progressive, and as such gave the best he had for the profession he loved and for the country of his adoption. He leaves an honorable name as physician, citizen and friend.

He is survived by two sons: Carter and Ronald.

Signed: JAMES GRASSICK, M.D.,
Honorary Chairman,
and G. M. WILLIAMSON, M.D.,
Chairman.

Speaker John Moore: May the Chair recommend that, especially at this time of strife, it seems a good time for us to stand and pause a minute in silent tribute to those who are gone.

(The moment of Silent Tribute was paid those who had passed on).

Committee on Public Policy and Legislation

There is not much to report this year as there is no session of the Legislature. Work is being done on a New Basic Science Bill that we hope can be put over next winter.

Signed: W. C. FAWCETT, M.D.,
Chairman.

Committee on Radio

There are no activities to report regarding the Radio Committee. There has been no meeting of the committee this year.

Signed: A. C. FORTNEY, M.D.,
Chairman.

Committee on Crippled Children

There are no activities to report regarding the Committee on Crippled Children. There has been no meeting of the committee this year.

Signed: A. R. SORENSON, M.D.,
Chairman.

Committee on Tuberculosis

We have had a great deal of difficulty in getting adequate representation of the committee at meetings. Only one meeting was held at the time of the last state meeting at Grand Forks and a very small attendance was on hand. However, the various members of the committee have reported rather active work on the tuberculosis problem in North Dakota. A majority of the societies have presented programs on tuberculosis in which members of the local society, representatives from the Sanatorium, and the State Health Department have taken part. We recommend a continuation of this activity and its expansion, if possible, to include meetings open to the public at which informative material may be presented. The State Health Department stands ready to coöperate in this matter and upon adequate notice from any component medical society will be pleased to arrange a popular program, amplified by appropriate motion pictures. Where this type of meeting has been held, the public response has been very gratifying.

The committee wishes to report a whole-hearted coöperation from Dr. F. J. Hill, the acting State Health Officer, and his predecessor, Dr. Maysil Williams, and the State Anti-Tuberculosis Society under the direction of Miss Helen Katen. We do not believe that ever in the history of the anti-tuberculosis work in North Dakota have the three major functioning bodies, the Anti-Tuberculosis Society, the State Health Department, and the State Tuberculosis Committee had such desirable cooperation. The State Department of Health and the Anti-Tuberculosis Society have been particularly efficient in following up contacts and we believe that we can report that never in the history of the state has this feature of anti-tuberculosis work been so adequate. There is, however, room for improvement which must come from the diligence of the members of the medical profession in enlisting the aid of these agencies in their individual problems.

To emphasize what the North Dakota Anti-Tuberculosis Association is doing, we call to your attention that the society is prepared to spend $28,000 of the county and city Seal Sale receipts for use in the tuberculosis control program. This money will be spent in assisting the medical profession in securing tuberculin tests for all contacts of known cases, chest X-ray of positive reactors, and a re-check service for ex-patients to discover relapses. In some families where resources are inadequate and no other funds are available, nutritional aid will be added to the service. In order to avoid eligibility questions related to free service with such limited funds, it will be necessary for physicians to secure the approval of the local county or city Seal Sale Committee Chairman through the county superintendent of schools, or the city nurse.

For many years it has been our impression that the greatest problem in tuberculosis work in North Dakota existed in the counties where there are large concentrations of Indian population. However, at a meeting of the Advisory Health Council of North Dakota, held late in 1941, it was learned that the Indian problem was apparently not as serious as thought, and that the search for active cases had been fairly well carried out by the Indian Service. However, the great problem was obtaining adequate treatment for those individuals who required it. It was promised by the representatives of the Indian Service to take the matter up with the Indian Affairs Committee and this was done by Dr. F. J. Hill. He has since informed the committee, April 6, 1942, that the representatives from the Indian Service had promised to provide funds for the treatment of thirty Indians immediately at the State Sanatorium, if the Sanatorium will accept them. Thus, it will be seen that we have a very favorable report to make on the results of the work which is being done by the committee and related agencies in the control of tuberculosis, and that we have made a very good start with the Indian problem.

It was rather a pleasant surprise to note that up until April 15th, only 36 cases of tuberculosis had been found among the Selective Service candidates examined from North Dakota. Of these 36 cases, 18 were rejected. Two of these had minimal lesions; one moderately advanced, and 15 not specified. Of these, eight were specified as "active" and two specified as "inactive-reinfection phase." Eleven were held under observation and seven were accepted for service. This small incidence of tuberculosis is a recommendation for the type of anti-tuberculosis work that is being carried on in the state.

It is recommended that the personnel of the committee remain the same for the ensuing year.

Signed: J. O. ARNSON, M.D.,
Chairman.

Editorial Committee on Official Publication—1942

The situation of the Association relationship to the official publication, the JOURNAL-LANCET, remains unchanged and the committee recommends the maintenance of the present arrangement. As previously recommended, the membership of the Association in North Dakota should make better use of the facilities which our journal offers for publication of interesting cases and editorial matter. The editorial staff of the JOURNAL-LANCET reports a dearth of material coming from the membership of our State Association.

Signed: J. O. ARNSON, M.D.,
Chairman.

Committee on Pneumonia Control

The Committee on Pneumonia Control met with members of the State Department of Health in the Capitol Building in Bismarck on November 16, 1941.

The mortality from pneumonia is declining markedly in North Dakota. Before establishment of the Pneumonia Control Program there were approximately 400 deaths annually from this disease, and pneumonia ranked third as a cause of death in the state. In 1940, there were 288 deaths and in 1941, 200 deaths from pneumonia. Pneumonia ranked fifth as a cause of death in 1941. The mortality rate in 1941, as in 1940, was still considerably higher in the Non-Control Group than in the Control Group of cases. It was only 2.8 per cent in the Control Group compared to 21.8 per cent in the Non-Control Group. The mortality rate for the two groups combined was about 15.5 per cent. The mortality hazard is still greatest at the extremes of life, 29.5 per cent of the deaths occurring under one year of age, and 33 per cent occurring over the age of 70.

Approximately two-thirds of the cases were diagnosed as lobar pneumonia, and the rest bronchopneumonia. Seventy-five per cent of the pneumonia patients were treated in hospitals, and the others at home.

The predominant types of pneumococci found were Type I in 37 per cent, Type II in 13.5 per cent, and Type III in 6 per cent. The average dose of anti-pneumococcic serum was

60,000 units per case; the average dose of sulfapyradine was 18.5 grams per patient; and the average dose of sulfathiazole was 28.4 grams per patient. The cost per patient of treatment under the program was approximately $25.00, as it was in 1940. This is about the average cost per patient throughout the United States.

The patients' eligibility for treatment under the program is decided by the physician, and it is not necessary to secure a certificate of medical indigency from the local welfare board unless the physician wishes to do so to protect himself.

In 1940 and 1941 physcians reported cases of pneumonia to the Health Department four times as frequently as they did in previous years. During the three years preceding the establishment of the pneumonia control program an average of 312 cases of pneumonia were reported to the Health Department each year. In 1940, the first year of the control program, 1,284 cases of pneumonia were reported and in 1941, 1,413 cases of pneumonia were reported to the State Department of Health. In spite of this marked increase, many instances of pneumonia are still not reported to the Health Department. During the first ten months of 1941, 162 cases were reported only by death certificate. The reporting of cases has been greatly simplified since the first of this year with a single report card to be filled out and mailed directly to the State Health Officer as soon as the case is completed.

Sulfadiazine is now available for distribution at all control stations in the state in addition to sulfapyradine and sulfathiazole. A fee of $5.00 will be allowed by the Health Department for a diagnostic X-ray film of the chest of any patient suspected of having pneumonia or pneumonia with complications, who, in the physician's opinion, is unable to pay for the film. This will make earlier diagnosis and treatment possible. It is hoped the privilege of this X-ray service will not be abused by the physicians. The annual conference for technicians of the control stations will be held again this year in order to keep laboratory procedures standardized. The Rolla Community Hospital will be approved as a typing station after the technician has attended the technician's conference.

Respectfully submitted,
Signed: Paul H. Rowe, M.D.,
Chairman.

Committee on Cancer

This committee has continued to assist the Women's Field Army in its effort to reduce the mortality from cancer in North Dakota. There are indications that the educational campaign sponsored by this organization is producing results. The State Health Department has recently revealed a reduction in cancer deaths in North Dakota from 606 in 1940 to 575 in 1941. The rates per 100,000 population were 94.4 in 1940 compared with 89.5 in 1941. These figures, although not startling, are encouraging because the trend in most states is for the death rate to rise each year.

Every physician in the state is urged to continue, or increase, his interest in the early diagnosis of cancer, and the educational campaign of the Women's Field Army. By doing so, 25 per cent of those who die today from cancer will be saved in the future.

Signed: L. W. Larson, M.D.,
Chairman.

Committee on Fractures

A meeting of the Fracture Committee was called for May 18, 1941, during the annual meeting of the State Association in Grand Forks. There were about four members present. The various fracture problems were discussed.

(1) It was unanimously agreed that a fracture committee should be established in every hospital in the state and that this committee should review all fracture cases and report monthly at the staff meetings.

(2) It was also agreed that we should urge the continuance of the Red Cross emergency stations on the highways and should give this work our support.

(3) The Fracture Committee also desired to compliment the Program Committee of the State Association on devoting a portion of the program to the subject of fractures.

Dr. C. J. Meredith of Valley City has advised me that a Fracture Committee has been appointed at the hospital in Valley City. It is urgently requested that the other members of the Fracture Committee endeavor to have such committees appointed in the other hospitals throughout the state, if they have not already done so.

During the year I have had several communications from Dr. Charles Scudder of Boston. In one of his late communications he suggested that we have a round table discussion on fractures for our state meeting. Inasmuch as the program has already been arranged for this year, the Secretary of the Association was notified of this request in order that it might be considered for the 1943 meeting.

Respectfully submitted,
Signed: R. H. Waldschmidt, M.D.,
Chairman.

Committee on Medical Economics

During the past two years there has been a notable improvement in the financial condition of the residents of North Dakota. This has lightened, if it has not removed, the economic cares of the practicing physician. With the improvement in tax collections and the lightening of their load, counties and county welfare boards are, or should be, in a better position to care for the many aged, unemployables, and the like for whom they are primarily responsible. No major problems have been presented to this committee and no meetings have been called.

We have not had any direct contact with representatives of the Farm Security Administration during the past year. Indirectly we have heard of one or two counties being approached to set up a local medical prepayment plan under Farm Security Administration auspices. Nothing apparently has been developed. We understand that representatives of the FSA have approached the hospital association regarding the setting up of a hospital plan for their clients. So far as is known these negotiations are not proceeding very actively.

We have prepared and submit the following report on Medical Service plans as requested by the House of Delegates last year.

SURVEY OF MEDICAL SERVICE PLANS

At the last annual session of the House of Delegates the Economics Committee was requested to make a survey of medical service plans. This has been carried out. Inasmuch as most plans are at the present time in a somewhat experimental stage it would seem that, for the present, we should content ourselves with a short summary of what medical service or prepayment plans consist. It so happens that the Bureau of Medical Economics of the American Medical Association is presenting a rather complete study of this subject at this year's annual meeting. This will be published and available to all who are interested.

The idea behind prepayment medical plans is simply insurance, a spreading of the burden among many. Some people talk as if it were some magic formula whereby all of the economic factors connected with illness may be solved. This is hardly the case, but it does represent a practical manner in which persons of low or moderate income can budget for illness. It does not in any respect solve the problems concerned with providing care to the indigents. Rather in certain respects prepayment plans may accentuate this problem.

Fundamentally regardless of the sponsor, all prepayment or medical service plans are the same. They may vary greatly as to details. There are two main types:

1. Health and accident insurance written by insurance companies and providing specific cash indemnities.
2. Organizations which contract to deliver or pay for medical services rendered, within certain limitations.

In addition, we have hospital insurance groups who are showing a marked tendency to include a certain amount of medical or surgical benefits in their policies. Medical service plans may be sponsored by medical or lay groups. They may be voluntary or compulsory.

If medical they may be sponsored by state society, county society or local association. They may permit free choice of physicians or the members may have to accept a given group clinic or individual. They may be large or small.

Lay groups sponsoring plans may be a labor union, a large industry, an insurance company, promoters of various types. In these cases the plans are usually quite similar, but the lay group must either hire, by salary or contract, medical men who supply the service. It is assumed that our society is not greatly interested in this type of plan.

They all have in common a fixed fee per individual or per family for which the group contracts either to furnish, or pay for, certain medical services. The size of the fee varies widely and no accurate information is available as to just what the costs may be. It is anticipated that experience of some of the better run groups will eventually supply a fairly reliable estimate of what the premium might be. Necessarily the premium will vary as to the extent of the benefits allowed. All plans have certain limitations of benefits, many of them a ceiling on the amount payable to any one subscriber per year. Certain chronic ailments such as tuberculosis, syphilis, mental disease, confinements, during the first year of membership, and others are usually excluded.

Collection of dues constitutes a large problem and most plans operate only with large employed groups who pay their dues by the check-off or payroll deduction.

Up to the present the collection of dues from individuals has not seemed to be very satisfactory. Few plans are in operation in rural communities. It is suggested that for success in a rural community groups would have to be formed around a coöperative, a creamery, an elevator or the like.

A wide difference of opinion exists as to the probable demand for such plans. In general it may be said that workers in large industrial plants have been moderately receptive as have also groups of office workers such as municipal employees.

Rural communities to date have either not shown any great interest or the collection and selling difficulties have been considered too great for sponsors to try and put their plans into effect among farm people.

A medical service plan requires:

1. A sponsor, preferably a state medical society.
2. An enabling act by the State Legislature.
3. Cash for initial expenses.
4. Salesmanship. These programs have to be sold in an aggressive manner.
5. Competent staff.
6. Determination of area to be served. It must be a sufficiently large area to give a good spreading of the risk. Consideration must be given to types of population, whether rural or urban.

The services to be given must be accurately defined. Present experience indicates that it is best to offer:

1. General medical care in home, office or hospital.
2. Surgical operations.
3. Obstetrics.
4. Some provision for preventive medicine either by visiting nurse, inoculations or regular examinations.
5. X-rays to a limited extent.
6. Hospitalization, usually by a separate contract.

The probable cost per individual or family must be worked out on a basis which will provide an equitable return to the doctor without making the premium higher than low income families can meet. Membership should be limited to relatively low income groups. Administration must be efficient and ruthless in cracking down on those persons, medical or public, who are demanding and unfair. As we in North Dakota know only too well this is probably the most serious difficulty involved in any prepayment plan.

A good example of a state-wide comprehensive medical plan is that sponsored by the Michigan State Medical Society under the name of Michigan Medical Service. It came into being after the expenditure of $30,000 and a ten year period of study. The association was organized in 1939 and was advanced $17,800 for working capital by the state society. Control is completely by the medical profession through a number of boards. It is allied with the Michigan Hospital Service as to certain administrative details only.

Michigan Medical Service offers two types of contract, a medical service plan and a surgical service plan. Either may be purchased by employed groups for themselves only, or for themselves and their families.

The Medical Service plan provides for services in office, home or hospital, with the usual limitations regarding tuberculosis, mental, venereal disease, and malignancies. The subscriber has to pay the first $5.00 expense incurred in any one illness, thereafter the Medical Service pays up to a total in any one year of $325.00 for an individual, $550.00 for husband and wife and $875.00 for a family. The premium for this service which includes almost all the medical care an average family is likely to require is $2.00 per month for an individual, $3.50 for husband and wife, and $4.50 for an entire family including all children under 19 years of age. There is an age limit of 65 years.

The surgical benefit provides the following benefits, but only while the subscriber is a bed patient in a hospital; surgical; diagnostic, X-ray and maternity services (the latter after 12 months membership). It is designed for the more catastrophic illnesses requiring surgical treatment. The rate per month is 50 cents for an individual, more if 15 per cent of any group are female, $1.25 for husband and wife and $2.00 for a family including all children under 19.

In the Michigan experience the latter policy combined with a hospital service policy has a much greater appeal than the comprehensive medical service plan.

It is to be noted that these plans are being offered only to employed groups with a minimum of 25 and in some cases it is necessary that at least 50 per cent of employees subscribe to the service. This is to give an adequate spreading of the risk. They do not enroll individuals, but do have in effect the surgical benefit plan among the rural mail carriers. Mr. J. D. Laux, the executive director, states that they are planning on approaching farmers through the Michigan State Grange and Farm Bureau Federation.

As of July, 1941, they had 6,216 members enrolled in the medical service plan and 187,371 under the surgical benefit plan, a total of 193,587.

It is stated that in each month the full schedule of benefits equivalent to prevailing charges now made by doctors of medicine in Michigan for patients in the income group enrolled in Michigan Medical Service has been paid for all services.

It is difficult if not impossible to properly appraise the success of this plan at this time. It is very evident that the comprehensive medical service plan has met with only a very limited acceptance. It can be said that the plan is on a sound basis, well organized and well operated. Further developments may well be watched with interest.

To any who may be interested in securing more detailed information I would suggest that they get in touch with the Bureau of Economics of the American Medical Association or await the publication of the report to be presented at this year's annual meeting.

Insofar as this state is concerned, we feel that we would be well advised to await the outcome of the various experiments being conducted elsewhere. It is obvious that medical service plans are of no value to the indigent or very low income groups. Their most promising field is among persons with an income of from $1,000 to $2,000 per year with regular employment.

HOSPITAL INSURANCE PLANS

During the past few years there has been a rapid increase in hospital insurance. In general this seems to have met with a greater acceptance than have comprehensive Medical Service plans. It is estimated that there are fifteen million persons in the United States carrying hospital insurance. Following is a brief summary of the hospital insurance situation in North Dakota.

Of the private companies operating in the state as hospital service plans, the most extensive one is the North Dakota Hospital Service Association, whose activities are almost state-wide. These people cover about 20,000 persons with hospital insurance; their policies are all sold on the group plan and they carry no surgical benefit nor extra indemnities of any kind.

There are a number of old line companies operating in the state some of which write purely hospital benefit policies and others of which carry some form of surgical indemnities. The

Commercial Casualty of Newark, N. J., has been quite active and the North American Life & Casualty Company of Minneapolis is said to have written more than 7,000 policies in the state. This company carries regular hospital benefits besides surgical benefits.

There is also the Dakota Mutual Hospital Service Association, which is a North Dakota company, which has been operating since 1939 and which also has over 7,000 policies in force covering approximately 20,000 individuals. These policies are written individually rather than by groups; all the dealings are with the individual except that they recognize assignments, which may be made to the hospitals.

Since it is not likely that there is any overlapping in this type of insurance, it would seem that by a rough estimate 70,000 of our citizens must be covered by some type of insurance. The hospitals here have been well satisfied with their dealings with the North Dakota Hospital Service Association. From the physician's standpoint these plans are an advantage as a whole although it is a little difficult trying to persuade some individuals that they do not need hospital care just because they happen to become a little fatigued and then have them suddenly remember that they have a policy that provides a week's rest.

One other objection is the tendency of the public to consider the surgical benefits as a scale upon which to base surgical fees. This seems very minor compared with the other advantages.

Respectfully submitted,
Signed: W. A. Wright, M.D.,
Chairman.

Committee on Maternal and Child Welfare

As predicted in our report for 1941, there was a further decline in the maternal death rate in North Dakota. Quoting from the official organ of the U. S. Department of Labor, Children's Bureau, "The Child," a new low record for maternal mortality in any state with the rate of 17.2 per 10,000 live births.—North Dakota, for example, has been among the states with the lowest rates for several years.

For the United States for 1940, the maternal mortality rate is 37.6 per 10,000 live births.

The infant mortality rate for North Dakota for 1940 was 45.1 per 1,000 live births; in 1939 it was 49 per 1,000 live births. In this decline there is considerable cause for encouragement. The greatest saving in infant lives came in the neonatal period, i. e., the period of under 1 month of age. In this critical period we effected a drop of 3.1 per 1,000 live births over 1939. The decline in infant deaths from 1 to 11 months was 0.9 per 1,000 live births in 1940, compared with 1939.

For the United States for 1940, the infant mortality rate is 47 per 1,000 live births.

In 1939, 54.2 per cent of the 13,158 births in North Dakota occurred in hospitals; in 1940, 61 per cent of the 13,356 births in North Dakota occurred there. This is highly significant for it has been observed that practically all the states that had a large proportion of births in hospitals and few births attended by nonmedical persons had mortality rates for their mothers and infants lower than those for the United States as a whole. In 1939 6.3 per cent of the births in North Dakota were attended by nonmedical persons; in 1940 this had been reduced to 5.7 per cent.

Toxemias of pregnancy continue to be the main contributing cause of maternal mortality in North Dakota. Your committee feels that several factors are causative:

1. Neglect on the part of the patient in seeking medical advice prior to the onset of severe symptoms.
2. Failure of the medical attendant to properly classify these toxic patients.
3. Lack of adequate consultation.
4. Injudicious operative procedures to effect delivery.

To eliminate these causative factors, as far as possible, your committee has taken the following steps:

1. We have urged upon the Maternal and Child Health Division of the North Dakota State Department of Health that the pre-school conferences be continued without interruption and that every possible opportunity be taken by the Division to impress upon the women in attendance at these conferences the great importance of antepartum care. It is in the *small group of women* who have had *no antepartum care* that we find the largest number of the fatal toxemias.

War has taxed the resources of the Maternal and Child Health Division and the Public Health Nursing Division of the State Health Department to the limit and the problem of limited personnel and added responsibilities is an acute one. The educational campaign among child-bearing women emphasizing "See Your Doctor Early and Regularly Throughout Pregnancy" will be pushed to the limit but it must have the continued support of the medical profession to prove most effective. Your committee believes that the component district medical societies could do much to further this educational campaign among the laity by supplying speakers on antepartum care for homemakers clubs, parent-teachers organizations and women's clubs.

2. To aid in the classification and, therefore, in the more intelligent management of the toxemias of pregnancy, your committee has supplied to all North Dakota hospitals admitting maternity patients, the classification of the American Committee on Maternal Welfare, Inc. It is recommended that this classification be adopted throughout the state.

3. In its report to the House of Delegates last year, your committee called attention to the lack of consultations in obstetrics. In some instances there has been a noticeable improvement during the past year. In organized hospitals, this is a responsibility of the hospital staff; but in a larger sense, it is the individual responsibility of every physician who practices obstetrics. Your committee would again emphasize that adequate consultation in toxemias of pregnancy, before cesarean section, in cases of dystocia, sepsis and hemorrhage, cannot help but reduce maternal and infant mortality.

Injudicious operative procedures still contribute to maternal deaths in North Dakota. In a review of the case histories of deaths due to obstetric causes in 1940, cesarean section had been performed on four of the 23 women who died. Five of the 23 deaths were due to ectopic pregnancy, proven in each instance either at laparotomy or at autopsy, and three were due to hemorrhage, either during labor or in the puerperium. These cases, for the most part, had been well handled both surgically and obstetrically. Transfusions possibly might have been employed to better advantage in some instances but suitable donors may not always have been available. However, blood plasma is now commercially available and it should be made readily accessible in all hospitals for meeting the emergency of an obstetric hemorrhage.

At its last meeting, November 14, 1941, your committee was impressed by the fact that there has been a reduction in so-called "Maternity Homes" from 126 in 1940 to 93 in 1941. These "homes", with few exceptions, are inadequately equipped and incompetently managed by nonprofessional help. They usually represent an attempt upon the part of untrained or poorly trained women to make a living. While we might sympathize with this economic objective, we cannot approve of this method of caring for obstetric patients. Rather do we recommend a further improvement in obstetric facilities in our general hospitals with maternity departments. Wherever hospital staffs are organized, we recommend that at least three staff meetings a year be devoted to a review of the obstetric service and that at such meetings a program on obstetric subjects be given. Such programs cannot help but elevate the type of obstetric practice in any hospital.

Your committee feels that sufficient evidence has now accumulated to warrant the recommendation that a standard vitamin K product be given every six hours to the woman in labor. Evidence indicates that intracranial hemorrhage in the newborn has been reduced by this procedure. Certainly in cases of protracted labor, operative delivery and prematurity, the administration of vitamin K orally to the mother and, parenterally, to the infant in doubtful cases or where intrapartum oral administration to the mother is impossible or inadequate, seems indicated.

We have continued our efforts to promote postgraduate courses in obstetrics and pediatrics for North Dakota physicians at the University of Minnesota and at the University of Iowa.

The interest of our physicians in this type of postgraduate education continues unabated and every effort is being made to supply it. We gratefully acknowledge the splendid coöperation we have had from the faculties and directors of these universities in making their courses available to us.

We have coöperated with the Division of Nursing of the North Dakota State Department of Health in making available a limited number of scholarships in postgraduate obstetric nursing to North Dakota graduate nurses from accredited training schools. These scholarships qualify the nurse as an obstetric supervisor, after she has successfully passed the prescribed course, and provide that she shall return to her own hospital for duty—or for duty in the state—for a period of at least two years. During the war emergency, this should serve to make a small but effective group of nurses available to meet the technical demands of an improved obstetric nursing service.

During the past year, as in all of the years that your Maternal and Child Welfare Committee has functioned, there has been the closest coöperation with the North Dakota State Department of Health. We would emphasize that this mutual coöperation has resulted in a clearer understanding of the public health aspects of maternal and child welfare problems by the medical profession and a greater appreciation of the importance of the individual physician by the State Department of Health. Following the departure of Dr. Maysil M. Williams for her year's leave of absence, President Fergusson appointed Dr. Frank J. Hill, acting state health officer, to the Maternal and Child Welfare Committee and he has agreed to serve as secretary of the committee, a position which Dr. Williams so admirably filled for several years. Your committee regards the appointment of Dr. Hill as most fortunate.

We would specifically commend the outstanding work of the Maternal and Child Hygiene Division under the capable direction of Dr. Viola Russell for the continued careful analysis of the maternal deaths in North Dakota. The assembling of the case histories required is a painstaking and never ending task, but of vital importance to any intelligent study of the causes of maternal deaths.

As has been stated in previous reports, funds for maternal and child welfare have been supplied by the Children's Bureau of the United States Department of Labor, through the North Dakota State Department of Health. A portion of those funds have made possible the postgraduate instruction in obstetrics and pediatrics that has been received by so many North Dakota physicians and the postgraduate training of nurses for positions as obstetric supervisors. We feel that the Children's Bureau has acted very wisely in making these funds available for postgraduate medical and nursing education in this state and we pledge our continued support to the furtherance of these educational projects. In these and in many other ways we have had the sympathetic and helpful coöperation of the Children's Bureau and your committee again desires to express its appreciation to that bureau for having so thoughtfully understood our aims and fostered our objectives.

In conclusion, your committee would commend the physicians of North Dakota for their continued efforts in the field of maternal and child welfare. The enviable position which North Dakota holds in its maternal mortality record for 1940—the lowest ever recorded in the United States—is striking evidence of what can be accomplished by coöperative effort. It can be improved still further by the continued coöperation and candid criticism of those directly responsible for the excellent results obtained thus far—the North Dakota physicians.

Respectfully submitted,
Signed: John H. Moore, M.D.,
Chairman.

Committee on Public Health

A meeting of the Committee on Public Health of the State Medical Association was called to order at 10:30 A. M., Sunday, April 12, 1942, in the offices of the State Department of Health by the chairman, Dr. F. J. Hill.

The following members of the committee were present: Drs. F. J. Hill, chairman; P. L. Owens, Bismarck; P. O. C. Johnson, Watford City; L. H. Landry, Walhalla; William Campbell, Valley City; H. B. Huntley, Kindred; R. C. Little, Mayville; J. A. Smith, Noonan.

An agenda was presented which included special problems in communicable disease control, present public health laws, and problems in the present emergency.

Dr. Frank J. Hill, acting state health officer, presented statistics which indicated that the medical profession of North Dakota has been discharging its responsibility for the public health of the people of North Dakota very admirably. According to official reports of the Census Bureau for the year 1940, North Dakota had a mortality rate of only 8.2 per 1,000 estimated population. The mortality rates from maternal causes, from syphilis, and alcoholism were the lowest in the United States in 1940. Tuberculosis control is progressing favorably with North Dakota ranking in sixth place as regards lowest tuberculosis death rates. The examination of the Selective Service for syphilis in North Dakota has revealed that our state ranks in the group having the lowest incidence of the disease in the United States. The above accomplishments have taken place through private physician-patient relationship in coöperation with educational activities of the North Dakota State Health Department.

Advisability of compulsory prenatal blood testing legislation was discussed by the committee. It was decided to recommend to the physicians of the state that they do prenatal blood tests voluntarily and indicate on the laboratory card that the specimen is to be examined for that purpose.

The committee after some discussion recommended that the practice of immunizing against scarlet fever be left up to the private physician, since at present it is not practicable as a public health measure.

After extensive discussion the Committee recommends that the following resolutions be adopted:

1. That a plasma procurement station connected with the State Public Health Laboratory be established.
2. That a compulsory vaccination law be presented to the State Legislature at its next session.
3. That the House of Delegates authorize the issuance of a booklet on "Health Achievements in North Dakota" by the Committee on Public Health of the North Dakota Medical Association in coöperation with the State Department of Health.
4. That the State Health Department request aid from the U. S. Public Health Service in supplying a mobile X-ray unit to examine all Mexican itinerant workers in North Dakota.
5. That the State Health Department request aid from the U. S. Public Health Service in supplying a mobile X-ray unit, if feasible, to examine apparently healthy adults according to the Wisconsin Plan, using 35 mm. method.

Respectfully submitted,
Signed: Frank J. Hill, M.D.,
Chairman.

Committee on Industrial Health

Shortly after the close of the 1941 meeting of the North Dakota State Medical Association the secretary of the Council of Industrial Health of the American Medical Association requested President Fergusson to appoint a state committee in North Dakota on Industrial Health. The committee which he appointed is a new one and is therefore making its first report to the House of Delegates.

At the very beginning it must be appreciated that North Dakota is not an industrial state, that the few industries are flour mills, packing plants and creameries located in some of the larger cities plus lignite coal mining in the western part of the state, which is nearly entirely of the stripping type. It is obvious from this that this committee cannot assume the importance that it does in states which are highly industrialized. North Dakota is basically an agricultural state and agriculture is an occupation which is attended by rather serious risks. It is possible that a consideration of the health of the agricultural worker could be properly included by this committee.

It is, of course, evident that the health of the industrial worker is vital to national security, yet with a few exceptions the requirements of industry in the fields of medicine, surgery and hygiene are being met in an incomplete manner. Medical service to industry falls in three principal professional groups, first, the full-time industrial physician who serves in one or more plants; second, private practitioner in general or special practice who is serving on a part-time basis (it is estimated that 80 per cent of medical service to industry is supplied in this fashion); third, the medical industrial hygienist who is frequently associated with government agencies who provides a consultative and investigative service to industry on request.

The general outline of the program would be as follows: (1) To encourage more adequate medical service within industry such as employment of full-time or part-time physicians and nurses; the use of preëmployment and annual physical examinations of employees; the maintenance of the proper sickness and accident reports; the provision of properly equipped first aid rooms; and the instruction of foremen in the general rules of first aid. (2) To investigate and record reports of occupational injury and disease. (3) To provide hygienic instruction within industrial groups on the control and prevention of communicable and occupational diseases.

The Secretary of the Council of Industrial Health of the American Medical Association has made the following recommendation to your committee under the date of March 30, 1942: "I should like to recommend once again that arrangements be made for official representation from your State Medical Association at the Fifth Annual Congress on Industrial Health to be held early next year. We need your support and the stimulus of an active and a successful program in North Dakota." Your committee would like to add their endorsement to this recommendation.

Signed: C. J. Glaspel, M.D.,
Chairman.

Committee on Medical Preparedness

Our country is engaged in the most desperate struggle in its history. To win, our human and material resources must be utilized to the limit. The medical profession will continue to play a vital role in the prosecution of the war.

Fortunately, the American Medical Association foresaw the problem of supplying medical personnel for the armed forces two years ago and took steps to solve it. With the coöperation of state committees, its Committee on Medical Preparedness obtained important information from over 181,000 physicians in the United States as to age, training, availability for military service, etc. As a result, the National Roster has more complete information on the medical resources in this country than on any other profession, trade or business. However, it became apparent a year ago that some official governmental agency would have to be created which could meet all phases of the problem. Accordingly, in response to a resolution passed by the House of Delegates of the American Medical Association in June, 1941, President Roosevelt authorized the creation of the Procurement and Assignment Service on March 31, 1941, under the office of Defense Health and Welfare Services of which Mr. Paul V. McNutt is the director. The directing board consists of five members, four of which are physicians of national reputation, headed by Dr. Frank Lahey, president of the American Medical Association, the fifth member being a dentist. The executive secretary is Dr. Sam F. Seeley. The service has three distinct functions:

1. To gather information relative to the professional capabilities of physicians, dentists and veterinarians.
2. To supply such professional men for the armed forces, Veterans Bureau, United States Public Health Service, Industry, etc.
3. To protect the civilian health by preventing the depletion of medical facilities in every community.

This is a tremendous task when it is understood that it must depend to date at least upon the voluntary enlistments of doctors for service. Congress has decreed that all males from 20 to 45 years of age are available for military service, if physically qualified. However, physicians in this age group are subject to the same rules for deferment as all other male citizens. As a result, the majority of physicians have been deferred because of dependents. There seems to be a distinct tendency to remove, or at least, modify, this ruling, but until this is done, physicians with dependents can escape the draft. The problem, then, is to encourage every physician of draft age, who is not essential in his home community, to offer his services to the government. It is estimated that 16,000 additional physicians will be needed for service by January, 1943. The army needs 5,000 physicians now, in excess of those already in service. The medical profession must supply this demand or it will be faced by its greatest danger, regimentation. It is no secret that steps have already been taken to write legislation to conscript the entire profession, if the present program of the Procurement and Assignment Service fails.

The organization of the Procurement and Assignment Service is simple. In addition to the directing board, the nation is divided into nine areas similar to the Army Corps Areas. Each area has a chairman and an area committee consisting of physicians, dentists and veterinarians. There is a chairman in each state. He has a state committee and as many subcommittees as are considered necessary. The function of the state committee is to recommend to the area chairman whether a physician is available for military service, or is essential for the civilian needs. The area chairman considers this information in addition to criteria determined by his area committee, and then makes the final decision. The members of your state committee represent every geographical area in the state and are men of strong character, unquestioned integrity, and high standing in their local society and State Association. I know they can be depended upon to act wisely and well in the future as they have in the past.

Every physician has recently received an enrollment form from the Procurement and Assignment Service. By signing it, the physician places his services at the disposal of the government and he will be given the opportunity to serve according to his ability and his preference for the type of service he chooses. He does NOT enlist when he signs the enrollment form. He merely indicates his willingness to serve if called upon. Unless the plan fails and special legislation is passed, it is not mandatory that he accept an assignment given to him. An intensive campaign will be inaugurated in every state to insure the enrollment of every physician, regardless of age, training, physical condition, etc.

The demands of the government in this program have placed a great responsibility upon our State Association. To coöperate, as we must, will require the expenditure of time and money on the part of the state chairman and his committee members. No one expects compensation for his time, but he should not be required to defray the expense. The House of Delegates is urged, therefore, to request the Council to make an appropriation for the Committee on Medical Preparedness, the amount to be determined by the Council.

American Medicine has been challenged to perform a herculean task in this war. To meet the challenge, every physician must contribute his share by coöperating, without reservations, with the Procurement and Assignment Service. As physicians we have, in this war, not only our American way of life at stake, but also our American form of medical practice.

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Since preparing the above report, the chairman of this committee has been ordered to attend a meeting in Omaha of all state chairmen for the Procurement and Assignment Service on May 8th. It is expected that a program as outlined in the May 2nd issue of the *Journal of the American Medical Association* will be discussed. If so, a Special Army Officer's Recruiting Board will be sent to North Dakota to confer with physicians personally, and commission them immediately. Your chairman hopes to be able to make a more complete report of this Omaha meeting to the membership, possibly at the Jamestown convention.

Signed: L. W. Larson, M.D.,
State Chairman.

Report of the Delegate to the American Medical Association—1941

Dr. A. P. Nachtwey, delegate, submitted the following report as printed in the hand-book which was referred to the Reference Committee on the Reports of the Council, Councillors and Delegate to the American Medical Association.

Your Delegate to the American Medical Association begs leave to submit the following report:

The American Medical Association held its Ninety-second Annual Session in Cleveland, June 2 to 6, 1941. The attendance was 7,269. This represents a sizable cross section of a total membership of approximately 119,000.

The address of the Speaker was a constructive review of the duties of the delegates.

Due respect was paid by him to the memory of those who died since the 1940 meeting of the organization.

The address of the President, Dr. Van Etten, was a masterpiece. It will well repay the members of this House of Delegates to look up this address as published in the Proceedings in the House of Delegates in the *Journal of the American Medical Association*. It contains much that will serve to give you confidence in the elective and appointive personnel of the American Medical Association.

He particularly stressed the point that the platform of the American Medical Association is the centralization of national health functions and the decentralization of individual sickness under local control. The platform has had wide approval and at the present time Washington Health Bureaus are operating under the directions of the Federal Security Administrator.

The transactions of the House of Delegates were marked by harmony and expedition. Reference committee reports were considered in a serious and earnest manner, and with very few exceptions, were harmoniously and expeditiously dispatched.

Conspicuous in the Cleveland session were the exhibits. The unanimous approval of physicians who spent many hours in attendance on both the scientific and technical exhibits are a proof of the tremendous value attached to these features. There can be no doubt that these scientific exhibits offer one of the greatest concentrated postgraduate education in medicine that can be seen anywhere in this or any other country.

The problems which confronted the House of Delegates were largely military, social and economic. But there was also distinct evidence of concern of the House with problems of scientific advancement.

The medical profession is ready, through the work of the Committee on Medical Preparedness, to meet the needs of the government and civilian agencies for medical service.

The House recommended the adoption of a resolution requesting the United States Government to adopt a plan for the immediate establishment of a central authority with representatives of the civilian medical profession to be known as the Procurement and Assignment Agency for physicians for the Navy, Army and Public Health Service and for the Civilian and Industrial needs of the nation.

A joint meeting of the Committee on Medical Preparedness and the Council on Medical Education in hospitals proposed a noteworthy resolution relative to the continued education of physicians, requesting the War Department to provide for all medical students in approved medical schools and for premedical students accepted for enrollment in approved medical schools, some form of military status which will make clear the fact that, in preparing themselves to become physicians for the services of the country, these students are already actually giving an essential service under the Preparedness program and are not seeking to evade, escape or defer their responsibilities.

The above resolution was hooked up with the relocation of physicians, so that the civilian population will enjoy a good distribution of medical services. Plans were created for the presentation to proper authorities that would insure regional appointees who could serve as liaison between organized medicine and the government. The county society unit rules supreme in American medicine. Any state society committee can only step out through a majority support of its county units.

Especially significant was the action taken by the House of Delegates to establish a committee on Pan-American Relationships, which is to be concerned with the establishment of scientific interchange with the medical society of the South American, Mexican, Cuban, Porto Rican and Canadian colleagues.

The House of Delegates voted in executive session, without a dissenting vote, to carry onward the trial of the case of the United States Government vs. the American Medical Association, et al, so that a decision may be had from the highest courts as to to place which organized medicine is to occupy in our economy.

Many state presented resolutions insisting that physicians upon draft boards be paid for their services. It was also brought out that there were more than twenty citizens serving without pay to every physician; upon draft, advisory and appeal boards. These citizens have as much right to be paid as physicians that give as much or more time. With even a minimum of organization, physicians can complete these patriotic examination services without neglecting their practices. The cost of paying all citizens upon boards would be tremendous. It was voted that this sacrifice should be a measure of patriotism.

The Council on Medical Education and Hospitals of the Association was specifically required by the House of Delegates to take the leadership in aiding the certifying boards of the various specialties and also the activities of the advisory boards created by these certifying boards, to the end that they function primarily for the good of the people and for the advancement of medical science and to avoid the tendency toward the establishment of select guilds, which in the opinion of the reference committee, seemed in some instances to prevail.

The House rejected a resolution on the eligibility of women physicians and surgeons for the medical reserve corps. This resolution was proposed by approximately 8,000 women physicians and surgeons of the United States. The discussion developed the fact that legislation by Congress would be required to affect this change in the qualifications of medical reserve officers. After a hearing from the representative of the Surgeon General of the Army and listening to other statements, the House agreed that it would not be to the best interests of the defense program to advocate legislation at this time.

Again a surgeon of international repute has been elected by the House of Delegates of the American Medical Association to the highest honor in the province of scientific medicine. Dr. Fred W. Rankin of Lexington, Kentucky, was without opposition selected as President-Elect.

Respectfully submitted,
Signed: A. P. Nachtwey, M.D.,
A. M. A. Delegate, 1941.

NEW BUSINESS

Amendments to the By-Laws

Dr. P. H. Woutat, Grand Forks, introduced the following amendments to the By-Laws which were referred to the Reference Committee on the Reports of the Standing Committees:

CHAPTER V. Section 1. (*Be amended to read.*) "All elections shall be by ballot, and a majority of the votes cast shall be necessary to elect. If there is only one nomination for an office, the election may be made by acclamation upon unanimous consent of the members of the House of Delegates, present and voting."

CHAPTER IX. (*Add the following sections.*) Section 4. *New Members.* New members shall be assessed the per capita annual dues if they become members for the major portion of the Association's fiscal year, and one-half the annual dues for six months or less.

Section 5. *Assessments for Delinquent Members.* Members who have dropped from the Association for non-payment of dues, shall, upon reinstatement to good standing in the Association be assessed the total per capita annual dues, regardless of the date during the fiscal year of the Association on which such reinstatement becomes effective.

Resolution on Proposed Legislation Affecting Mental Deficients in the State

Dr. P. H. Woutat, Grand Forks, presented on behalf of Dr. LaMont, superintendent of the state School for the Feeble-Minded, Grafton, North Dakota, the following Resolution which was referred to the Committee on Resolutions:

RESOLUTION

Tentative Outline State Control Program

Whereas: It is estimated that about 6,000 cases of mental deficiency outside of the State School are at present in the homes, without adequate control or supervision, and

Whereas: A more comprehensive and adequate plan of mental testing is desirable in the rural and urban schools of the state, and

Whereas: a systematic check-up of the treatment and control of all mental defectives is needed in the homes, and

Whereas: An authoritative source of information as to mental testing is of great importance for the use of officers and clergy in the performance of marriage and the issuance of marriage licenses;

Be It Resolved, That this Association lend its support in the coming Legislature to the enactment of laws providing for

1. A state commission in mental deficiency consisting of
   (a) Superintendent of State School,
   (b) A physician,
   (c) An attorney.
2. A sub-commission in each county with the same personnel as the present board of insanity.
3. The employment by the state commission of
   (a) A psychologist or psychometrist,
   (b) A social worker,
   (c) A stenographer,
   to make a county by county survey of the entire state with the purpose of providing an authoritative and permanent card-index record of all mentally deficient persons and to provide later supervision of control of such cases within the homes, schools, or in other penal and charitable institutions.
4. That the general plan of such a commission and survey be based upon the South Dakota law for control of the feeble-minded, with such improvements and adaptations as may be deemed advisable.

Be It Resolved, Also, That the North Dakota State Medical Association instruct its Legislative Committee to use whatever influence may be necessary in the proper presentation and support of a suitable bill covering state control of the mentally deficient to the next Legislature and to lend its assistance in the formation of such a bill, to make it constitutionally adaptable in North Dakota .

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Dues

The Speaker asked for a motion to change the per capita dues for the coming year. There being no such motion, the Speaker ruled that the dues will remain the same.

Resolution on the Problem of Nursing Education in North Dakota

Dr. Josephine Stickelberger, Oberon, presented on behalf of the Devils Lake District Medical Society, a Resolution which was referred to the Committee on Resolutions.

Presentation of President

The Speaker appointed Drs. Benson and DePuy to escort Dr. F. W. Fergusson, President, to the Chair who spoke as follows:

"I do not have much to say at this time. It has been rather a peaceful year; there have been no controversies, or controversial matters coming up. Everyone is busy. With the advent of the War and also the advent of better financial conditions in the state, we all have considerable work to do. I have named the following members of the House of Delegates to the Nominating Committee: Dr. A. P. Nachtwey, chairman, Dr. William Campbell, and Dr. P. H. Woutat."

Reference Committees

The Speaker asked the Secretary to announce the personnel of the Reference Committees and asked each chairman to notify his committee members when and where the committee will meet.

The personnel of the Reference Committees as appointed by the Speaker was as follows:

To consider the report of the secretary and special committees: W. E. G. Lancaster, M.D., Fargo, chairman; C. J. Glaspel, M.D., Grafton; A. R. Sorenson, M.D., Minot; W. A. Wright, M.D., Williston; A. E. Westervelt, M.D., Bowdon.

To consider the report of the council, councillors, and delegate to the American Medical Association: T. L. DePuy, M.D., Jamestown, chairman; C. C. Smith, M.D., Mandan; H. A. LaFleur, M.D., Mayville; O. T. Benson, M.D., Glen Ullin.

To consider the reports of the standing committees: R. H. Waldschmidt, M.D., Bismarck, chairman; Carl Elofson, M.D., Fargo; P. H. Woutat, M.D., Grand Forks.

Committee on resolutions: A. P. Nachtwey, M.D., Dickinson, chairman; G. W. Hunter, M.D., Fargo; A. H. Reiswig, M.D., Wahpeton.

Adjournment

The First Session of the House of Delegates was adjourned at 3:10 P. M. on motion made by Dr. R. H. Waldschmidt, seconded by Dr. A. P. Nachtwey, and carried. It was agreed that the Second Session of the House be held at 8:30 Monday evening.

SECOND SESSION
of the
HOUSE OF DELEGATES
Monday, May 18, 1942

The Second Session of the House of Delegates was called to order by the Speaker, Dr. John H. Moore, at 8:40 P. M. in the main dining room of the Gladstone Hotel.

Roll Call

The Secretary called the Roll. Nineteen delegates responded and the Speaker declared a quorum present. The following Delegates and Alternates responded:

Doctors:

G. W. Hunter, Fargo.
W. E. G. Lancaster, Fargo.
C. E. Elofson, alternate, Fargo.
J. Stickelberger, Oberon.
P. H. Woutat, Grand Forks.
C. J. Glaspel, alternate, Grafton.
W. A. Wright, Williston.
Olaf Haraldson, Minot.
A. R. Sorenson, Minot.
A. H. Reiswig, Wahpeton.
William Campbell, Valley City.
R. H. Waldschmidt, Bismarck.
O. T. Benson, Glen Ullin.
C. C. Smith, Mandan.
J. P. Merrett, Marion.
A. P. Nachtwey, Dickinson.
T. L. DePuy, Jamestown.
H. A. LaFleur, alternate, Mayville.
A. E. Westervelt, Bowdon.

Order of Business Changed

The Speaker asked the House of Delegates for permission to change the order of business. This request was granted upon motion by Dr. C. Elofson, seconded by Dr. DePuy, and unanimously carried.

Report of the Reference Committee on the Reports of Standing Committees

Dr. R. H. Waldschmidt, chairman, presented the following report and moved its adoption. The motion was seconded by Dr. Woutat and carried unanimously.

Your Reference Committee recommends the adoption of the following By-Laws (as introduced by Dr. P. H. Woutat at the First Session):

CHAPTER V. SECTION 1. "All elections shall be by ballot, and a majority of the votes cast shall be necessary to elect. If there is only one nomination for an office, the election may be made by acclamation upon unanimous consent of the members of the House of Delegates present and voting."

CHAPTER IX. SECTION 4. *New Members.* New members shall be assessed the per capita annual dues if they become members for the major portion of the Association's fiscal year, and one-half the annual dues for six months or less.

SECTION 5. *Assessments for Delinquent Members.* Members who have dropped from the Association for non-payment of dues shall, upon reinstatement to good standing in the Association be assessed the total per capita annual dues regardless of the date during the fiscal year of the Association on which such reinstatement becomes effective.

Respectfully submitted,
R. H. WALDSCHMIDT, M.D., Chairman
P. H. WOUTAT, M.D.
C. E. ELOFSON, M.D.

Election of Officers

Dr. A. P. Nachtwey, chairman, presented the following report, moved its adoption and that the nominees be declared unanimously elected. The motion was seconded by Dr. Waldschmidt. The Speaker asked if there were any further nominations to be made from the floor. There being none, the question was voted upon and carried unanimously. The Speaker declared the nominees as having been duly elected.

For:

President-Elect—Dr. Frank Darrow, Fargo.
1st Vice-President—Dr. A. O. Arneson, McVille.
2nd Vice President—Dr. James F. Hanna, Fargo.
Speaker of the House—Dr. John H. Moore, Grand Forks.
Secretary of Association—Dr. L. W. Larson, Bismarck.
Treasurer of Association—Dr. W. W. Wood, Jamestown.
Delegate to A. M. A.—Dr. A. P. Nachtwey, Dickinson.
Alternate Delegate to A. M. A.—Dr. O. T. Benson, Glen Ullin.
Members of the Board of Medical Examiners:
  Dr. W. H. Long, Fargo.
  Dr. F. W. Fergusson, Kulm.
  Dr. John Graham, Devils Lake.
Councillors:
  Fourth District—Dr. A. D. McCannel, Minot.
  Fifth District—Dr. F. L. Wicks, Valley City.
  Ninth District—Dr. A. E. Westervelt, Bowdon.

Respectfully submitted,
A. P. NACHTWEY, M.D., Chairman
WILLIAM CAMPBELL, M.D.
P. H. WOUTAT, M.D.

Selection of Meeting Place for 1943 Annual Session

The Secretary read the following invitation from the Sixth District Medical Society, Bismarck, North Dakota:

"To the House of Delegates, North Dakota State Medical Association: The members of the Sixth District Medical Society extend a cordial invitation to the North Dakota State Medical Association to hold its annual meeting in Bismarck in 1943.

Signed: W. B. PIERCE, M.D., Secretary,
Sixth District Medical Society."

On motion made by Dr. DePuy and seconded by Dr. Hunter, and unanimously carried, Bismarck was selected as the meeting place for the 1943 Convention.

Presentation of Minutes

The Secretary read the Minutes of the First Session which were approved as read.

Report of Reference Committee on Reports of Secretary and Special Committees

Dr. W. E. G. Lancaster, chairman, presented the following report, which was adopted section by section and as a whole, on motions of Dr. Lancaster, duly seconded and carried, after discussion:

1. *Report of the Secretary*: It is the desire of the Committee to call attention to the fact that twenty per cent of the men practicing in the state are not members of the State Association, and each district should be mindful of its responsibility in keeping this figure as low as possible.

Our Committee was unable to fathom how our Secretary covers the work of the Association with the added burden of the various State Military programs. We feel that he is to be highly commended for the job he is doing.

2. *Report of the Committee on Medical Preparedness*: This committee is to be commended for the efficient work it has done. It is recommended that the Council appropriate funds for this committee to carry on its work.

3. *State Defense Council Request for Plasma Collection Centers*: It is recommended that there be appointed a committee for the establishment of plasma centers in compliance with the request of General L. R. Baird, in his letter to the House of Delegates of the North Dakota State Medical Association. These stations should be chosen at strategic points throughout the state, and to establish such stations it is recommended that an emergency fund be appropriated by the Council to effectively initiate the work of the committee. It is recommended that this committee work in coöperation with the State Office of Civilian Defense.

W. E. G. LANCASTER, M.D., Chairman
C. J. GLASPEL, M.D.
A. R. SORENSON, M.D.
W. A. WRIGHT, M.D.
A. E. WESTERVELT, M.D.

Report of Reference Committee on Reports of Chairman of Council, Councillors, and Delegate to A. M. A.

Dr. T. L. DePuy, chairman, presented the following report, which was adopted on motions of Dr. DePuy, duly seconded by Dr. Nachtwey and carried:

1. *Report of the Chairman of the Council*: This Reference Committee has examined the report of the Chairman of the Council and wishes to commend him very highly for his excellent report.

2. *Report of Councillors*: Upon checking the Councillor reports, we find that the State Association is functioning in very good shape. In regard to the suggestion of Dr. Williamson in regard to the Traill-Steele District Society being amalgamated with the Grand Forks District, we decided to leave that matter to the Traill-Steele Society to decide for themselves.

3. *Report of the Delegate to the American Medical Association*: We want to commend the Delegate for his excellent report on the convention.

Respectfully submitted,
T. L. DEPUY, M.D., Chairman,
C. C. SMITH, M.D.
H. A. LAFLEUR, M.D.
O. T. BENSON, M.D.

Report of Reference Committee on Reports of Standing Committees

Dr. R. H. Waldschmidt read the following report which was adopted section by section and as a whole, on motions of Dr. Waldschmidt, duly seconded and carried, after discusion:

1. *Report of Committee on Medical Education*: Your Reference Committee recommends the adoption of the report on Medical Education and commends the work of Dr. H. E. French and his committee.

2. *Report of Committee on Necrology and Medical History*: Your Reference Committee recommends the adoption of the report of the Committee on Necrology and Medical History and that the House of Delegates instruct the Secretary of the North Dakota State Medical Association to express to Dr. James Grassick, Grand Forks, North Dakota, the Association's appreciation for his outstanding work on this committee during these many years.

3. *Report of the Committee on Public Policy and Legislation*: Your Reference Committee recommends the adoption of the report of the Committee on Public Policy and Legislation and that the committee continue to use its judgment in regard to the passage of the Basic Science Bill.

4. *Report of Committee on Radio*: Your Reference Committee accepts the report of the Committee on Radio.

5. *Report of the Committee on Crippled Children*: Your Reference Committee recommends the acceptance of the report of the Committee on Crippled Children.

6. *Report of the Committee on Tuberculosis*: Your Reference Committee recommends the adoption of the Report of the Committee on Tuberculosis.

7. *Report of the Editorial Committee on Official Publication*: Your Reference Committee recommends the adoption of the Editorial Committee on Official Publication.

8. *Report of the Committee on Pneumonia Control*: Your Reference Committee recommends the adoption of the report of the Committee on Pneumonia Control. It has been called to the attention of your Reference Committee that the present method of the distribution of drugs and serum for treatment of pneumonia by the State Public Health Department is meeting strong opposition from the State Pharmaceutical Association. Your Reference Committee recommends coöperation between the North Dakota State Medical Association, State Pharmaceutical Association and North Dakota State Department of Health to settle this matter.

9. *Report of the Committee on Cancer*: Your Reference Committee recommends the adoption of the report of the Committee on Cancer and that the present committee be reappointed.

10. *Report of the Committee on Fractures*: Your Reference Committee recommends the adoption of the report of the Committee on Fractures.

11. *Report of the Committee on Medical Economics*: Your Reference Committee recommends the adoption of the report of the Committee on Medical Economics and that the House of Delegates commend the committee on their exhaustive study.

12. *Report of the Committee on Maternal and Child Welfare*: Your Reference Committee recommends the adoption of the Committee on Maternal and Child Welfare report, and commends the work being done by this committee.

13. *Report of the Committee on Public Health*: Your Reference Committee recommends the adoption of the report of the Committee on Public Health, with the following amendments:

1. That the House of Delegates consider the recommendations of Dr. Lancaster's committee in regard to the establishment of plasma and serum stations. That question has been taken care of.
2. Ask the Committee on Medical Legislation to consider the advisability of sponsoring such law as a compulsory vaccination bill.
3. That the House of Delegates does not approve the issuance of a booklet on Health Achievements in North Dakota.

4 and 5. That the House of Delegates does not approve that the State Health Department request aid from the United States Public Health Service in supplying a mobile X-ray unit to examine all Mexican workers in North Dakota, or to examine apparently healthy adults according to the Wisconsin Plan, using 35 mm. method. Since your Reference Committee feels that our present X-ray facilities are already adequate to carry on such examinations.

14. *Report of Committee on Industrial Health*: Your Reference Committee recommends the adoption of the report of the Committee on Industrial Health and that the House of Delegates designate C. J. Glaspel, Grafton, N. D., to officially represent the North Dakota State Medical Association at the Fifth Annual Congress on Industrial Health.

Respectfully submitted,
R. H. Waldschmidt, M.D., Chairman
Carl Elofson, M.D.
P. H. Woutat, M.D.

Report of Committee on Resolutions

Dr. A. P. Nachtwey, chairman, presented the following report which was adopted on motion of Dr. Nachtwey, seconded by Dr. Waldschmidt and carried, after discussion:

Resolution presented by Dr. Woutat at the request of Dr. LaMont on "proposed legislation affecting mental deficients in the state": Your Committee met in conference with Dr. LaMont and had an exhaustive discussion concerning the merits of this resolution. Your Committee very carefully reviewed the report of the State Commission and subcommission for control of feeble-minded of South Dakota and found itself heartily in accord with the purpose and scope of the title, to-wit: The feeble-minded; the wards of the state; and the segregation required. Your Committee believes that it is to the best interests of the state of North Dakota that a similar resolution and legislation by the state be adopted in accordance with the resolution proposed by Dr. LaMont. Your Committee desires to have this resolution referred to the Legislative Committee to use whatever influence may be necessary for the proper presentation and support of a suitable bill.

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Dr. A. P. Nachtwey, chairman, reported that his Committee had carefully considered the resolution presented by Dr. Josephine Stickelberger on *"The Problem of Nursing Education in North Dakota,"* and had referred it back to Dr. Stickelberger with the request that the resolution be rewritten. The revised form was then considered by the Reference Committee but the Reference Committee reports that it is unable to make a report on the resolution. After considerable discussion, Dr. Woutat moved that a temporary recess of the House for ten or fifteen minutes be taken for the purpose of rewriting the resolution and consideration by the Reference Committee. The motion was seconded by Dr. Nachtwey and carried unanimously. The House recessed at 10:10 P. M.

The House was called to order at 10:25 P. M. by the Speaker.

Dr. A. P. Nachtwey, chairman of the Committee on Resolutions, presented the following report which was adopted on motion of Dr. Nachtwey, seconded by Dr. Elofson, and carried unanimously:

Resolution from the Devils Lake Society: Your Reference Committee on Resolutions begs leave to submit the following report. We favor the substance of this resolution and move its adoption:

"At a meeting of the Devils Lake District Medical Society, Devils Lake, N. D., May 12, 1942, the problem of nursing education in the state of North Dakota was discussed at quite some length.

The following resolution was adopted:

Whereas, new statute passed in 1939 by the State Legislature gives the President of the North Dakota State Nurses Association and Board of Directors the power to dictate what instructions must be given in nurse's training schools, and the power of governing all the training schools; and

Whereas, a new statute passed in 1939 by the State Legislature gives the President of the North Dakota State Nurses Association and Board of Directors the power to dictate what instructions must be given in nurses' training schools, and the power of governing all the training schools; and

Whereas, a National Emergency exists in which the demand for nurses both at home and in the Armed Forces is becoming more acute;

Therefore, Be It Resolved, that the Devils Lake District Medical Society favors the appointment of a Committee on Nursing Education. This committee to be appointed consisting of one member from the State Medical Association, one member from the Nurses Association, and one from the State Hospital Association. This committee to confer with the Legislative Committee to favor a change in the existing legislation so that it may be applicable to the present emergency.

The Devils Lake District Society instructs its delegate to present this resolution to the House of Delegates of the State Association.

Respectfully submitted,
Devils Lake District Medical Society."

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Dr. A. P. Nachtwey, chairman, presented the following resolution which was adopted on motion of Dr. Nachtwey, seconded by Dr. Waldschmidt, and carried unanimously:

Resolution of Vote of Thanks to Jamestown Agencies: Your Committee on Resolutions would like to present the following resolution:

Whereas, the city of Jamestown, the Jamestown Country Club, the Jamestown Chamber of Commerce, the North Dakota State Hospital and the Stutsman County Medical Society have individually and collectively worked wholeheartedly for the entertainment of the North Dakota State Medical Association, and have done everything within their power to make the sessions of the State Association in Jamestown most comfortable and successful,

Now Be It Resolved, that a vote of thanks be extended to these agencies, individually and collectively, for their splendid coöperation, and including thanks for their hospitality.

Respectfully submitted,
A. P. Nachtwey, M.D., Chairman
G. W. Hunter, M.D.
A. H. Reiswig, M.D.

New Business

On motion made by Dr. Waldschmidt, seconded by Dr. Hunter, and carried, the Council was requested to appropriate funds to defray the travel expenses of Dr. C. J. Glaspel in connection with his attendance at the next Annual Congress on Industrial Health to be held in Chicago.

Adjournment

On motion made by Dr. Hunter, seconded by Dr. Benson and carried, the House of Delegates adjourned sine die at 10:40 P. M.

SCIENTIFIC PROGRAM

Tuesday, May 19, 1942

8:30—Registration at Convention Hall.
9:00—"Bleeding in Pregnancy"—Dr. Ralph Reis, Chicago, associate professor of obstetrics, Northwestern University Medical School.
10:00—"Glaucoma and the General Practitioner"—Dr. G. M. Constans, Bismarck, N. D.
11:00—View Exhibits.
11:10—"The Care of the Premature Infant"—Dr. Erling Platou, Minneapolis.
12:15—Round Table Luncheons. Subjects: "Obstetric Hemorrhage"—Dr. Ralph Reis, Chicago. "Feeding and Immunization Procedures"—Dr. Erling Platou, Minneapolis.
2:00—View Exhibits.
2:15—Symposium on "Encephalomyelitis".
"Infectious Encephalitis in North Dakota in 1941"—Dr. Herald Cox, Rocky Mountain Laboratory, Hamilton, Montana.
3:20—"Clinical Features"—Dr. L. W. Larson, Bismarck.
3:45—"Sequella"—Dr. A. C. Fortney, Fargo.
4:00—"Pathology of Western Equine Encephalitis"—Dr. Paul Breslich, Minot, N. D.
4:15—"Studies on the Etiology and Serum Treatment of Encephalitis During the Epidemic in North Dakota and Minnesota in 1941"—Dr. E. C. Rosenow, Rochester, Minn.

Wednesday, May 20, 1942

9:00—"Presidential Address"—Dr. F. W. Fergusson, Kulm, N. D.
9:30—"Medical and Public Health Aspects of Trichinosis"—Dr. W. Wright, Bethesda, Md.
10:30—"Emergency Treatment of Fractures"—Dr. Stanley R. Maxeiner, assistant professor of surgery, University of Minnesota.
11:00—View Exhibits.
11:15—"The Emergency Treatment of Lacerations"—Dr. V. G. Borland, Fargo.
11:40—Installation of Incoming President: Dr. Fergusson introduced the newly elected President of the Association, Dr. A. R. Sorenson, Minot, N. D.
12:15—Round Table Luncheon. Subject: "Fractures"—Dr. Stanley R. Maxeiner, Minneapolis, Minn.

The afternoon session was held at the State Hospital—courtesy of Dr. A. M. Fisher, Superintendent

2:30—"The Depressed Patient"—Dr. Gordon Kamman, St. Paul.
3:30—"Nervous and Mental Disease Clinic"—conducted by Dr. Gordon Kamman with the assistance of the Medical Staff of the State Hospital.
Tour of Inspection of the State Hospital.

Installation of President

Wednesday Morning, May 20, 1942, 11:40 A. M.

Dr. F. W. FERGUSSON: I wish to introduce the newly-elected President, and to conduct him into office as is the custom. I will select Dr. N. O. Ramstad and Dr. W. A. Gerrish to escort Dr. Sorenson to the platform.

Dr. RAMSTAD: Dr. Fergusson, I am pleased to present our newly-elected President, Dr. Sorenson.

Dr. F. W. FERGUSSON: It is quite unnecessary to make any lengthy introduction to this group, of Dr. A. R. Sorenson. In turning over to you this office, Dr. Sorenson, I can assure you the full coöperation of the officers and men of the Association. I will now present you the gavel and with it my congratulations and best wishes for the coming year.

Dr. A. R. SORENSON: It is unnecessary for me to state how much I appreciate the honor conferred upon me. I will to the best of my ability, perform the duties of this office. I will ask for full coöperation from the members of the Association. Many of you will be called upon to actively participate in the work of committees. I thank you again for this honor.

Presidential Address*

F. W. Fergusson, M.D.
Kulm, North Dakota

IN war time every person in whose makeup there is a spark of patriotism, wishes his duties would call for some performance which would make him an acclaimed hero. There will be many of our citizens who will have that opportunity. For most of us, however, duty will be a prosaic, as well as a stern, task master. Each person can do something useful and helpful. We need not travel to fields afar to perform services which will help win the war.

In all wars, disease has claimed more soldiers than guns or their equivalents. Our fight against disease must proceed. The men or women in our Health Department may render service just as helpful in winning the war, as a health worker, as it would be possible to do as a combatant or as an officer in the Medical or Sanitary Corps.

A particularly serious problem which arises out of the mass induction of men into the Army and the Navy is the maintenance of health standards of the civilian population during the emergency. For each rise of a million men in the Army, will come a call for about sixty-five hundred physicians. Unless this conscription of physicians is properly spread out, many communities, especially the smaller ones, will be left without adequate medical care. It is well that this problem and others growing out of the emergency mobilization of man power are to be given careful study. Protection of the physical well-being of the Nation is an important element in creating a strong national defense.

In two decades, war has become more terrible, largely through its mechanization. But it is comforting to know that the contribution of science has not been entirely one-sided. Wounds which in other wars meant agonizing death or disabling mutilation for life, now can be treated effectively.

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*Presented before the North Dakota State Medical Association, Wednesday, May 20, 1942, 9:00 A. M.

Shock and infection, largely, have been overcome, providing the proper materials and trained personnel to administer them are available. This has been apparent from the experience of the British during the past two years. It was illustrated strikingly by the United States Navy Medical Corps at Pearl Harbor. Horrible as the tragedy was, it would have been much worse in World War I.

In the interval between the two wars there has been no complacency on the part of America's Naval and Military physicians. They have had constantly in mind the high cost in death and even higher cost of war injuries in disability and suffering.

They have made notable contributions to the advance of medical science. Even more important, they have kept informed on the medical discoveries which have come at a steadily accelerating rate from universities and hospitals, have insisted on efficiency in new technics and have applied these to service needs.

A people preparing to defend themselves against a potential enemy may easily forget that they are faced with a foe which in the course of every war in history has been far more deadly than anything military science can contrive. This foe is pestilence. Almost up to the present generation and in some cases up to the past few years, there were essentially no defenses at all against many of the worst diseases. For the first time there are defenses against such destroyers as typhus, yellow fever, plague, tetanus and perhaps soon, influenza.

As America approaches a crisis it is satisfying to know that its soldiers and its people will have all the defenses science can provide against this foe. The medical departments of its Army, Navy and Air Corps are the best in the world. The alertness of its Public Health Service insures against any attacks in the dark. And, above all, it has a body of approximately 180,000 practicing physicians, men who have met extraordinarily high standards, who are coöperating to the fullest extent in safeguarding the health of the population in general.

From the standpoint of public health, the present situation, which we are facing, is entirely different from any ever faced before in a preparedness program. In times past it was not a very serious problem to mobilize the army. Today, with the advent of what is called total war, there must be total preparedness, and that sort of preparedness does not involve only the matter of armed forces but the mobilization of a nation of one hundred and forty millions of people.

Manpower, the human resources available for both civilian and military pursuits, is of course the biggest factor in national defense. The effectiveness of manpower depends, however, more on physical and mental fitness than on mere numbers. There must be the will to live the lives of free men and there must be the physical stamina, as well as the mechanical resources, to back up that will against any threat which may challenge it.

Our mental as well as our physical health demands attention. The creation of war hysteria is a powerful weapon in the hands of an enemy or potential enemy. The only sure method for keeping our people truly fit is to make an earnest effort to have our citizens keep their mental and physical strength up to the highest point possible. Each and every one of us can do his part in this program by intelligent living and intelligent thinking.

On behalf of the State Association, I wish to thank the members of the Stutsman County Medical Society for the fine program and entertainment provided for this meeting. It has been a real pleasure to meet again in Jamestown.

I wish also to thank the officers, councillors and members of the committees for their service during the past year. Dr. Larson, our Secretary, is to be especially complimented on the efficient manner in which he handles the duties of his office.

In closing, I want to express my appreciation for the opportunity of serving as President of the North Dakota State Medical Association.

NORTH DAKOTA STATE MEDICAL ASSOCIATION ROSTER--1942

Membership by Districts

CASS COUNTY MEDICAL SOCIETY

PRESIDENT	
G. Wilson Hunter	Fargo
SECRETARY-TREASURER	
E. M. Haugrud	Fargo
Bacheller, Stephen	Enderlin
Baillie, W. F.	Fargo
Boerth, E. H.	Buffalo
Bond, J. H.	Fargo
Borland, V. G.	Fargo
Burton, P. H.	Fargo
Clay, A. J.	Fargo
Clark, Ira Jr.	Casselton
Darrow, Frank	Fargo
Darrow, Kent	Fargo
Dillard, J. R.	Fargo
Elofson, Carl E.	Fargo
Evans, Lester J.	New York, N. Y.
Fjelde, J. H.	Fargo
Fortin, H. J.	Fargo
Fortney, A. C.	Fargo
Foster, Geo. C.	Fargo
Hanna, J. F.	Fargo
Haugrud, Earl M.	Fargo
Hawn, Hugh W.	Fargo
Haynes, G. H.	Lisbon
Hendrickson, G.	Enderlin
Hunter, G. W.	Fargo
Huntley, H. B.	Kindred
Ivers, G. U.	Fargo
James, J. B.	Page
Joistad, A. H.	Fargo
Kaess, A. J.	Fargo
Klein, A. L.	Fargo
Lancaster, W. E. G.	Fargo
Larson, G. A.	Fargo
Lewis, T. H.	Fargo
Long, W. H.	Fargo
Limburg, A. M.	Fargo
Mazur, B. A.	Fargo
Miller, H. W.	Casselton
Morris, A. C.	Fargo
MacGregor, Murdock	Dickinson
Nash, Leo A.	Fargo
Nichols, A. A.	Fargo
Nichols, W. C.	Fargo
Oftedal, Axel	Fargo
Oftedal, Trygve	Fargo
Ostfield, J. R.	Fargo
*Patterson, T. C.	Lisbon
Richter, E. H.	Hunter
Rostel, Hugo	Fargo
Rothnem, T. P.	Fargo
Sand, Olaf	Fargo
Schatz, George	West Fargo
Sederlin, E. L.	Fargo
Sedlak, O. A.	Fargo
Sinner, B. L.	Fargo
Skarshaug, H. J.	Washburn
Skelsey, A. W.	Fargo
Sigurdsson, J. O.	West Fargo
Stafne, Wm. A.	Fargo
Stolinsky, A.	Boise, Idaho
Swanson, Joel C.	Fargo
Taintor, Rolfe	Fargo
Tronnes, Nels	Fargo
Urenn, B. M.	Fargo
Watson, E. M.	Fargo
Weible, R. E.	Fargo
Weible, R. D.	Fargo
Winn, W. R.	Fargo

DEVILS LAKE DISTRICT MEDICAL SOCIETY

PRESIDENT	
Bernard Hughes	Rolla
SECRETARY-TREASURER	
D. W. Fawcett	Devils Lake
Arneson, A. O.	McVille
Call, A. M.	Rugby
Clayman, S. G.	San Haven
Drew, G. F.	Devils Lake
Engesather, J. A. D.	Brocket
Fawcett, W. C.	Starkweather
Fawcett, D. W.	Devils Lake
Fawcett, J. C.	Devils Lake
Fawcett, N. W.	Devils Lake
Graham, J. D.	Devils Lake
Greengard, M.	Rolla
Hughes, B.	Rolla
*Horsman, A. T.	Devils Lake
Keller, E. T.	Rugby
Kohlmeyer, F. C.	Lakota
Laugeson, L. L.	San Diego, Calif.
Mattson, R. H.	McVille
McDonald, J. A.	Cando
McIntosh, G. J.	Devils Lake
McKeague, D. H.	Maddock
Olafson, K.	Cando
Reed, P.	Rollette
Smith, C.	Devils Lake
Sihler, W. F.	Devils Lake
Serhus, L. N.	Rollette
Stickelberger, J.	Oberon
Toomey, G. W.	Devils Lake
Vigeland, J. G.	Brinsmade

GRAND FORKS MEDICAL SOCIETY

PRESIDENT	
N. A. Hardy	Minto
SECRETARY	
W. C. Dailey	Grand Forks
Alger, L. J.	Grand Forks
Bartle, J. P.	Langdon
Benson, T. Q.	Grand Forks
Benwell, H. D.	Grand Forks
Brown, G. F.	Grand Forks
*Burrows, F. N.	Bathgate
Countryman, G. L.	Grafton
Caveny, J. P.	Langdon
Campbell, R. D.	Grand Forks
Canterbury, E. A.	Grand Forks
Dailey, W. C.	Grand Forks
Deason, F. W.	Grafton
Fields, A. B.	Forrest River
French, H. E.	Grand Forks
Flaten, A. N.	Edinburg
Glaspel, C. J.	Grafton
*Glaspel, G. W.	Grafton
Goehl, R. O.	Grand Forks
*Grassick, James	Grand Forks
Griffin, Vern	Grand Forks
Grinnell, E. L.	Grand Forks
Haagenson, E. C.	Grand Forks
Hardy, N. A.	Minto
Haugen, C. O.	Larimore
Hetherington, J. E.	Grand Forks
Irvine, V. S.	Park River
Jenson, A. F.	Grand Forks
Johnson, C. A.	Larimore
Lamont, J. G.	Grafton
Landry, L. H.	Walhalla
Law, H. W. F.	Grand Forks
Leigh, R. E.	Grand Forks
Leibeler, W. A.	Grand Forks
Lohrbauer, L. T.	Grand Forks
Lommen, C. E.	Fordville
Mahowald, J. R.	Grand Forks
Moore, J. H.	Grand Forks
Muus, O. H.	Grand Forks
Mulligan, V. A.	Langdon
Panek, A. F.	Milton
Peake, Margaret	Grand Forks
Quale, V. S.	Grand Forks
Rand, C. C.	Grafton
Ransom, Robt.	Grand Forks
Robertson, Frank	East Grand Forks, Minn.
Ruud, H. O.	Grand Forks
Ruud, M. B.	Grand Forks
Rystad, O. H.	Grand Forks
Silverman, L.	Grand Forks
Stratte, J. J.	Grand Forks
St. Clair, R.	Northwood
Thorgrimson, G. G.	Grand Forks
Tompkins, C. R.	Grafton
Vance, R. W.	Grand Forks
Vollmer, Frederick	Grand Forks
Wagar, W. D.	Michigan
Waldren, G. R.	Cavalier
Waldren, H. M. Sr.	Drayton
Waldren, H. M. Jr.	Drayton
Weed, F. E.	Park River
*Welch, Wm. H.	Larimore
Williamson, G. M.	Grand Forks
Witherstine, W. H.	Grand Forks
Woutat, P. H.	Grand Forks
Wold, Howard	Grafton
Youngs, N. A.	Grand Forks

KOTANA DISTRICT MEDICAL SOCIETY

PRESIDENT

H. T. Skovholt — Williston

SECRETARY

C. Lund — Williston

AbPlanalp, I.	Williston
Craven, J. P.	Williston
Craven, J. D.	Williston
Dochterman, L. B.	Williston
Hoeper, P. H.	Mankato, Minn.
Johnson, Maxwell	Watford City
Johnson, P. O. C.	Watford City
Jones, Carlos	Williston
Korwin, J. J.	Williston
Lund, C.	Williston
Skovholt, H. T.	Williston
Wright, W. A.	Williston

NORTHWEST DISTRICT MEDICAL SOCIETY

PRESIDENT

M. T. Lampert — Minot

SECRETARY-TREASURER

Woodrow Nelson — Minot

Beck, Charles	Harvey
Blatherwick, W. E.	Van Hook
Breslich, Paul	Minot
Brunner, Harmon	Minot
Cameron, A. L.	Minot
*Carr, A. M. Sr.	Minot
Carlson, H. A.	Minot
Carr, Andy M.	Minot
Craise, O. S.	Towner
Cronin, D. J.	Minot
Devine, J. L. Sr.	Minot
Devine, J. L. Jr.	Minot
Downing, Wm.	Minot
Dyson, Ralph	Minot
Durnin, Lieut. W. G.	Minot
Erenfeld, H. M.	Minot
Erenfeld, Fred	Minot
Flath, M. G.	Stanley
Fischer, V. J.	Towner
Fulton, A. M.	Minot
Gammell, R. T.	Kenmare
Garrison, M. W.	Minot
Gerber, L. S.	Crosby
Goodman, Robt.	Powers Lake
Grangard, H. O.	Ryder
Greene, E. E.	Westhope
Hanson, George C.	Minot
Halliday, D. J.	Kenmare
Hammargren, A. F.	Harvey
Halvorson, H. L.	Minot
Halvorson, Clayton	Minot
Haraldson, Olaf	Minot
Ittkin, Paul	Mohall
Johns, S. M.	Huntington Park, Calif.
Johnson, O. W.	Rugby
Johnson, J. A.	Bottineau
Johnson, Lieut. C. G.	Rugby
Kelsey, C. M.	Minot
Kermott, Henry	Minot
Kermott, L. H.	Minot
Kaufman, M. I. H.	Velva
Knudson, K. O.	Glenburn
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Ransom, E. M.	Minot
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Rowe, Paul H.	Minot
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Fawcett, J. C.	Devils Lake
Fawcett, Newton W.	Devils Lake
Fawcett, W. C.	Starkweather
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---

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Blood Pressure as a Factor in Mortality*

Karl W. Anderson, M.D.
Minneapolis, Minnesota

EVER since K. Vierordt in 1855 determined blood pressure by palpation of the radial arteries and Marey in 1876 devised the first usable apparatus for estimating blood pressure, there has been discussion as to what constitutes normal blood pressure in man under various conditions.

This problem has been approached in many scientific and non-scientific ways. The laity and the profession at one time thought that 100 plus the individual's age could be considered normal, and it is still so thought by many doctors and a large percentage of the laity, judging by the letters I receive from all parts of the country. Especially do we encounter this view when we find it necessary to issue substandard insurance to a man, age 50, who has a blood pressure of 150/90. His physician or our own examiner many times will write to us when we offer such an individual a substandard policy, claiming that in their estimation the applicant has a normal blood pressure or is eligible for standard insurance because the blood pressure is not very far removed from their idea of normal. Particularly is this true when the family physician has probably already patted the applicant on the back and told him that his blood pressure is normal for his age and to forget it.

With the waning of this view concerning blood pressure, physicians began to consider the problem from the standpoint of the average blood pressure, but many forgot in using this term that it was an *average* blood pressure and therefore not necessarily a *normal* blood pressure. There is quite a variation from normal to average in many individuals. The average contains many hypotensive and hypertensive cases, particularly at the older ages, where there will be a predominance of hypertensive cases included in any figures in which the term "average" is used.

I shall not review the literature concerning the various studies that have been made to determine what is normal and what is average blood pressure for various groups. The studies of Dr. Diehl, Dr. A. E. Hines, Dr. David Ayman, and many others are well known. There have been specific objections to these various studies, some because the subjects were not a cross-section of the population, but rather were of special groups, such as students, etc. However, from all these studies it was apparent that blood pressure does not vary appreciably in normal adults with advancing age.

One of the most interesting articles that has been reported in the current literature is "The Range of Normal Blood Pressure" by Robinson and Brucer, published in the *Archives of Internal Medicine,* September, 1939. In this article they report a study of 11,383 persons from a statistical and clinical view; they find (1) that the normal range of systolic blood pressure for men and women is from 90 to 120 millimeters of mercury; (2) that the normal range of diastolic blood pressure for men and women is 60 to 80 millimeters of mercury; and (3) that normal blood pressure does not rise with age, but prehypertensive and hypertensive blood pressures do rise with age. This study apparently confirms much in the insurance statistical studies and definitely rules out that 100 plus the age is the normal or average blood pressure for adults.

The insurance companies have really popularized the use of the blood pressure apparatus in physical examinations. In fact, when this apparatus was not in common use they insisted that their appointed examiners have it and in their examination reports the insurance companies specifically asked for blood pressure readings. However, they were in the same position as the medical profession—they did not know what the variations in the normal blood pressure were, what the average blood pressures were at each ten-year period, what the normal pulse pressures were, or the significance of the variation from the average or the normal as far as mortality was concerned.

Early in 1925 the Joint Committee on Mortality of the Actuarial Society of America and the Association of Life Insurance Medical Directors published the results of an investigation of the effect of blood pressure on mortality. Since 1911, most of the life insurance companies have requested that blood pressures be taken on examinations for insurance either by auscultation or palpation. Originally, the medical departments of the insurance companies requested systolic readings, and when they did ask for the diastolic it was usually in the fourth phase. Only a few of the companies asked for both the fourth and fifth phases. The companies participating in this investigation sent in over 707,000 cases to be used in the original study. The object of this first study was naturally very much limited, as the insurance companies at that time knew very little about this subject. Therefore, some of the objectives laid down for this study were (1) to determine the average of the normal systolic, diastolic, and pulse pressures, according to age, height, and weight for men and women; (2) what would be the normal variation from these averages; and (3) the most common causes of death in each group.

The results of this investigation and others were not very satisfactory, for too many factors were considered, but in general for the first time some idea what the average blood pressure was for each 10 year period was obtained. It was found that height and weight affect blood pressure, but that they are not very important factors. It was found also that the variation from the average of 5 to 15 millimeters of blood pressure caused a very definite increase in mortality, and that normal

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*Read before the Minneapolis Academy of Medicine, February 12, 1942.

TABLE I.
Men—Standard Lives. Average Blood Pressure*

Age at Entry	Systolic (Mm.)	Diastolic (Mm.)	Pulse Pressure (Mm.)
10	100	67	33
15	115	75	40
20	120	79	41
25	121	80	41
30	122	81	41
35	123	82	41
40	125	83	42
45	127	84	43
50	129	85	44
55	131	86	45
60	134	87	47

*Blood Pressure; The Association of Life Insurance Medical Directors and The Actuarial Society of America, p. 12, 1925.

TABLE II.
Arterial Tension—Abnormal*

Ages	Aver. Systolic Blood Pressure	Over Aver. (X_1)	High (Y_1)	Highest (X_2)
15-29	120 mm.	125-135 mm.	136-144 mm.	145+ mm.
30-44	125 mm.	130-140 mm.	141-149 mm.	150+ mm.
45-53	130 mm.	135-145 mm.	146-154 mm.	155+ mm.
54-70	135 mm.	140-150 mm.	151-159 mm.	160+ mm.

	Exposed to Risk	Actual Deaths	Expected Deaths	Ratio of Actual to Expected Deaths
(X_1) Substandard	34,555	371	241.90	153%+5
(Y_1) Substandard	25,570	382	211.49	181%+6
(X_2) Substandard	46,750	750	348.25	215%+4

(The companies were asked to furnish only substandard data.)

*Medical Impairment Study, The Actuarial Society of America and The Association of Life Insurance Medical Directors, p. 39, 1929.

blood pressure is lower than the average. Table I shows the average blood pressure for men for each five year period, as found in this study. There were 545,121 cases which determined these averages. Another very important trend found in this first study was that there is a slight proportional increase in blood pressure with an increase in weight at the older ages, but that the increase in blood pressure as the age increases is practically the same for each "build" group. In general, the conclusions were that in cases where the blood pressure was below the average a more satisfactory mortality was obtained. Therefore, the average blood pressure does not appear to be the point of lowest mortality, and the mortality increases rapidly with the increase in blood pressure over the average. The favorable effect of systolic and diastolic blood pressures slightly below the average is greater at the younger than at the older ages. In other words, this was the first actual proof that we had that a person's normal blood pressure is not 100 plus his age, and that blood pressure varies very slightly in the normal for each ten year period.

In 1929 a similar joint committee made a further study on cases that had been issued on a substandard basis because of blood pressure. From this second study it appeared that an increase above the average of 5 to 15 millimeters or more caused an increase in mortality which had to be absorbed by the insurance companies or an extra charge would have to be levied against the insured.

Shortly after the first company entered the substandard life insurance field other companies followed, so that it was deemed advisable by those companies involved to make a statistical study of the cases they had all insured on a substandard basis. In the 1929 joint study there were over 100,000 applicants who were issued substandard insurance because of blood pressure in the companies that were participating in this investigation, and the result of this study is shown in Table II.

Let me try to explain briefly and not necessarily with actuarial precision, the meaning of the term 150 per cent mortality. In developing the cost of insurance there are many factors to be added—interest, expense, commission, taxes, a mortality charge, etc., which all together make up the premium rate. In other words, the mortality factor is only one of many others, but it is a very important one. The other factors remain the same; but we have found out from investigation that an additional charge must be added to overcome the premature deaths that are anticipated above the normal. Therefore, when we use the term 150 per cent mortality it doesn't mean that we charge 150 per cent of the premium but only of that mortality factor. This naturally will vary according to the type of policy; that is, the mortality charge for a Ten Year Endowment would be more moderate, because the possibility of the applicant's living for the next ten years would be very great. In the case of a Whole Life policy, such as an Endowment at Age 85, the individual's chances of living to the age of 85 are much less and therefore the chances that he will die before that age are much greater, so we will have to make a greater mortality charge.

There are some companies that do not write substandard policies, and there are others that write substandard policies on cases where the excess mortality does not exceed 225 per cent. Others underwrite to an even higher excess mortality figure. With this explanation it is evident in studying Table II that most of the companies had been too liberal in underwriting impaired blood pressure cases, as the study reveals that in the three groups the average ratings were only 105 to 130 per cent and the highest average rating given was only 165 per cent, which turned out to be entirely too low.

From a further study of Table II, it is apparent that when the blood pressure is 25 millimeters above the average, the mortality on a group of cases of that type is so high that there is a question whether or not they should be insured. Another way of studying this material is demonstrated in Table III, which shows the number of risks exposed who had blood pressures 5 millimeters or more above the average and were issued substandard policies because of this one impairment. From this it is evident that below the age of 35 the mortality was satisfactory, but from age 35 to 49, to which grouping one-half of the data applies, the mortality was 232 per cent. Again, a most interesting situation is found from age 50 on. Given the same blood pressure—5 millimeters or more above the average—there is a relative decrease of mortality from age 50 on. This might be due to selection, but I do not believe this answers the

TABLE III.

Mortality by Age at Entry for 5 or More Mms. Above the Average Systolic Blood Pressure*

Ages	(1) Exposed to Risk	(2) Actual Deaths	(3) Expected Deaths	Ratio % (2) -:- (3)
15-24	8,949	19	24.29	78% ± 12
25-29	9,606	35	27.21	129% ± 14
30-34	8,451	31	26.07	119% ± 14
35-39	12,648	120	50.73	237% ± 14
40-44	19,984	230	109.66	210% ± 8
45-49	17,942	344	138.62	248% ± 10
50-54	15,597	332	173.67	191% ± 8
55-59	9,754	274	161.81	169% ± 7
60-64	3,524	101	77.19	131% ± 9
65 and over	420	17	12.39	137% ± 22
All	106,875	1,503	801.64	187% ± 4

*Medical Impairment Study, The Actuarial Society of America and The Association of Life Insurance Medical Directors, p. 40, 1929.

TABLE IV.

Special Study of the Material in X_2, Table II.*

	Exposed to Risk	Actual Deaths	Expected Deaths	Ratio of Actual to Expected Deaths
(A)	25,830	412	201.13	205% ± 6
(B)	7,855	138	52.10	265% ± 16
(C)	1,141	34	8.85	384% ± 42
Total	34,826	584	262.08	223% ± 7

*Medical Impairment Study, The Actuarial Society of America and The Association of Life Insurance Medical Directors, p. 41, 1929.

TABLE V.

Corresponding Mortality Ratios of 1925 and 1929*

Ages at Entry	+16 mm. and More Joint Committee (1925)	+16 mm. and More Joint Committee (1929)
15-39	183% ± 29	182% ± 9
40-49	274% ± 27	256% ± 8
50 and over	165% ± 20	178% ± 5
All	207% ± 14	202% ± 4

*Medical Impairment Study, The Actuarial Society of America and The Association of Life Insurance Medical Directors, p. 42, 1929.

TABLE VI.

Mortality Ratios for Men According to Groups of Systolic and Diastolic (Fifth Phase) Blood Pressure Readings*

(Without Minor Impairments — All Entry Ages Together)

Systolic Reading (Mm.)	Diastolic Reading (5th Phase)—Mm. 64-83 (Pct.)	84-88 (Pct.)	89-93 (Pct.)	94-103 (Pct.)
118-132	90**	91	99	97
133-142	99	107	118	134
143-152	133	137	141	173
153-167	186	178	189	237
All	95	100	116	151

*Supplement to Blood Pressure Study, Joint Committee on Mortality of The Actuarial Society of America and The Association of Life Insurance Medical Directors, p. 3, (June) 1941.
**This included only systolic readings 128 to 132 mm.

whole problem, because further studies have indicated that there is an apparent better mortality in blood pressure cases after age 50.

Another independent study was made of 75 per cent of the above-mentioned material in which the high blood pressures—25 millimeters of mercury or more above the average—were restudied and divided into three classes, as demonstrated in Table IV. In Group A, blood pressures were up to 25–34 millimeters above the average; in Group B, 35–44 millimeters above the average; in Group C, 45 millimeters or more above the average. It was apparent from this that the mortality for B and C is so great that at least most companies could not insure them, as they do not write insurance where a mortality greater than 225 per cent is anticipated. The above-mentioned two studies have amply demonstrated that blood pressure is a more serious impairment than had been anticipated in the past.

Comparing the two studies of 1925 and 1929, it is interesting to note the correlation between the two, as demonstrated by Table V, again showing a greater mortality from ages 39 to 49 and a relative improvement in mortality with the same blood pressure readings over the age of 50.

Another study was made and published in 1939 by a similar joint committee of the Actuarial Society of America and the Association of Life Insurance Medical Directors. In this study 1,309,000 substandard and standard policies were analyzed up to 1938. There was a total of 49,098 deaths, and it was found that 45,879 of these deaths were on policies issued on a standard basis. Therefore, it seemed logical to include both substandard and standard as a group because the standard cases so outnumbered the substandard cases that it would have little effect on the results. This study, however, included cases which were substandard because of blood pressure, and it also included blood pressure cases that might have another minor impairment which itself would not call for a rating. In other words, if a man had nothing but this other minor impairment, he would have been given standard insurance. This material was studied both with and without minor impairments associated with blood pressure. As there were so many cases involved in this study, it was decided not to put in any cases in which the blood pressure was below 128/84, as these cases were known to have a favorable mortality as the result of previous study. In other words, this study included cases that had blood pressures above the average.

The best way of demonstrating the results of this study is shown in Table VI. Naturally there was a tremendous number of charts worked out from all different angles, but Table VI will show for convenience the results without any minor impairments, and it indicates an improvement in mortality since the original study. It also confirms again that people with a blood pressure of 150/90 will experience an excessive mortality. Further study of the illustration reveals that the upper limit of the so-called issuance of standard insurance would be somewhere between 133–142 systolic, with a diastolic of around 90 millimeters, and it is questioned by many actuaries and medical directors whether one can underwrite impairments where the expected mortality is as high as that found in the last column for the diastolic and systolic.

Another interesting finding in this study is that apparently these co-called minor impairments are of definite

TABLE VII.

Mortality Experience for Men According to Systolic and Diastolic (Fifth Phase) Blood Pressure Readings WITH MINOR IMPAIRMENTS*

All Entry Ages. Pct. Ratio of Actual to Expected Deaths

Systolic Reading (Mm.)	Diastolic Reading (5th Phase)—Mm.											
	53 & less	54-63	64-73	74-83	84-88	89-93	94-98	99-103	104-108	109-116	117+	Total
108-117					96							99
118-127					98	117	(142)					103
128-132			93	97	104	111	139					102
133-137			104	108	111	119	138					113
138-142			119	110	116	137	156	155				126
143-147				117	124	150	178	157				143
148-157				142	154	163	197	278	(276)			180
158-167						202	271	283				243
Total		(107)	97	103	108	130	167	205	244			117

If 25 to 49 deaths, the ratio is in parentheses: if less than 25 deaths, no ratio is shown.

*Blood Pressure Study, The Actuarial Society of America and The Association of Life Insurance Medical Directors, p. 32, 1939.

significance, and this is evidenced when they are associated with blood pressure readings that are above the average. These minor impairments in this study have been divided into three main groups as follows: (a) functional heart murmurs, trace of albumin, mild secondary anemia, phlebitis, casts (1–5), cystitis; (b) deafness, hernia, broken leg, fractured skull, mastoiditis, family history of tuberculosis; (c) acute articular rheumatism, lumbago, tularemia, neurasthenia, smoker's bronchitis, enlarged tonsils, dyspepsia, fistula. It is understood that these minor impairments when considered alone would not necessitate an extra premium, but in combination with blood pressure findings which are not excessive these minor impairments become of significance. This is amply demonstrated in Table VII, which in general shows that these minor impairments and this combination causes an increased mortality from 10 to 30 per cent.

For the physician in general practice this should have added meaning, because in the past there has been a tendency on the part of physicians, when they find a slight elevation of blood pressure, with only a very faint trace of albumin, sugar, or a few cells in the sediment of the urine, not to appreciate that these are probably Nature's way of showing danger signals. If this is not evident to the individual, it should be to the physician. He should not wait until these minor impairments become paramount before instituting what therapy is available to him to prolong the life of his patient.

There is one other condition which is of interest to physicians and that is the significance of a history of hypertension when the individual later shows a blood pressure approximating the average for his age and is otherwise in good physical condition. There is a tendency in the profession to minimize this history in the light of the favorable present findings. Dr. Lewis F. McKenzie, Associate Medical Director, and Mr. Pearce Shepherd, Assistant Actuary, of the Prudential Insurance Company of America, made an attempt to find the answer to this question, and I recommend this article which appears in the Proceedings of the Association of Life Insurance Medical Directors, Vol. XXIV, 1937. Their study reveals that there is a very high mortality ratio that can be expected in a group of cases where the blood pressure has previously been elevated. This study further indicates that "to disregard a temporary rise in blood pressure as merely the result of emotion, nervousness, or excitement at the time of examination, is to overlook the true import of the finding. Any rise in systolic blood pressure over 15 millimeters above the average for the age should be looked upon as indicating a potential or actual case of hypertension." It further appears at the present time that when essential hypertension has once begun it is questionable whether anything can be done to effect a permanent cure. Further conclusions which they make are as follows: "Too few realize that in its beginning and for long periods it may be present only occasionally, but when detected it is a danger signal that must not be made light of or disregarded by either its victim or the insurance company to which he may apply. It is a positive evidence of a probably shortened span of life. The fact that some live for years with enormously high blood pressures does not detract from the above statement." The above quoted statements, I believe, represent the newer viewpoints that are the result of these insurance studies.

CONCLUSIONS

1. It is apparent from the insurance studies, as well as the clinical studies which are now available, that the old adage of 100 plus the age as a correct interpretation of what should constitute normal blood pressure has been definitely proven false.

2. Blood pressure does not increase with age very appreciably, unless the person has hypertension or is of the hypertensive type.

3. Average blood pressure is not the same as normal blood pressure. From the studies available, normal blood pressure is below average blood pressure for each age group.

4. The most favorable mortality is found where the systolic blood pressure is below the average. Evidence is available which seems to indicate that the most favorable point might be as low as 15–20 millimeters of mercury below the average; so the concept that hypotension is a detriment to good health is absolutely fallacious, unless the low blood pressure is associated with a definite pathology.

5. The mortality increases in each age group with an increase of 5 millimeters of mercury or more above the average blood pressure for the age. It is apparent that statistically 140/90 is approximately the upper limit for the consideration of the issuance of insurance without showing a definite increase in mortality. That doesn't mean that that is the upper limit of normal blood pressure. It is above the normal blood pressure. Apparently, there is a slight increase in mortality which develops when the blood pressure is the average or higher. It is just a question whether or not this mortality increase is sufficient to warrant placing the applicant in a substandard class if his blood pressure is between the average blood pressure and a blood pressure of 140/90.

6. The favorable effect of low blood pressure increases with advancing age, so the closer one is to the average at the older ages, the better the expected mortality.

7. Where blood pressure is the only ratable impairment, but is associated also with a minor impairment which itself is not ratable, this minor impairment adds appreciably to the relative mortality in the case.

8. A history of high blood pressure with a subsequent low or average blood pressure or more will cause a substantial increase in mortality.

9. "Build", in itself, has only a minor effect on blood pressure. As a person grows in stature, there is a corresponding increase in blood pressure, but not necessarily does this growth in stature cause any increase above the normal blood pressure.

10. One of the most interesting findings in all these investigations—and this finding seems to be very consistent—is that there is a relative decrease in mortality in people 50 years of age and over who have moderate hypertension. In other words, a blood pressure of 150/90 is more significant under the age of 50 than over age 50.

11. The higher the diastolic pressure, the more increased the mortality, given the same systolic pressure. Most of these investigations have used the disappearance of sound for the fifth phase of diastolic blood pressure, and it appears that one may be eligible for insurance with a diastolic as high as 100 with systolic of around 158. This, of course, varies according to the different companies' rules, but at least these studies show that when you attempt to underwrite cases of blood pressure 155/98 and higher you are getting into a very excessive mortality group.

I have attempted to make a very hazy resumé of the various insurance studies concerning blood pressure. There are many points that I have not covered and there are many points that the insurance companies themselves, in spite of these studies, are unable to answer. They are continuing their medico-actuarial studies, and as clinical and scientific medicine continue to improve their knowledge concerning this subject, naturally there is going to be a corresponding improvement in the mortality of the insured and general population.

BIBLIOGRAPHY

1. Blood Pressure: Report of the Joint Committee on Mortality, the Actuarial Society of America and the Association of Life Insurance Medical Directors, New York, 1925.
2. Blood Pressure Study of 1939. New York. The Actuarial Society of America and the Association of Life Insurance Medical Directors, 1940.
3. Medical Impairment Study of 1929. New York. The Actuarial Society of America and the Association of Life Insurance Medical Directors, 1931.
4. Hunter, Arthur: Blood Pressure Among Standard Lives, Journal of the Institute of Actuaries (London) 70:60-64, 1939.
5. Hunter, Arthur: Supplementary Note on Blood Pressure, Transactions of the Actuarial Society of America 32:435-7, 1931.
6. Rogers, Oscar H., and Hunter, Arthur: Mortality Study of Impaired Lives No. 5, Proceedings of the 37th Annual Meeting of the Association of Life Insurance Medical Directors of America 13:176-193, 1927.
7. Diehl, H. S.: Variability of Blood Pressure, Archives of Internal Medicine 43 (June) 1929.
8. Ayman, David: Heredity in Arteriolar (Essential) Hypertension, Archives of Internal Medicine 53:792-802 (May) 1934.
9. Hines, Edgar A.: Range of Normal Blood Pressure on Subsequent Development of Hypertension, Journal of American Medical Association 115:271-274 (July 27) 1940.
10. Robinson and Brucer: Range of Normal Blood Pressure, Archives of Internal Medicine (Sept.) 1939.
11. Page, Irving H.: Effects of Angiotonin on Renal Blood Flow and Glomerular Filtrations, American Journal of Physiology 130:335-339 (Aug.) 1940.
12. Supplement to Blood Pressure Study: Report of the Joint Committee on Mortality, the Actuarial Society of America and the Association of Life Insurance Medical Directors, New York (June) 1941.
13. Moore, R. F.: Medical Ophthalmology, Philadelphia, P. Blakiston's Son & Co., 1925, p. 175.
14. Proceedings of the Staff Meetings of the Mayo Clinic 14:185-187 (March 22) 1939.
15. Burch, F. E.: Ophthalmoscopic Evidence of General Circulatory Disease, Minnesota Medicine p. 495-501 (Aug.) 1927.
16. MacKenzie, L. F., and Shepherd, P.: Significance of Past Hypertension in Applicants Later Presenting Normal Average Blood Pressures, Proceedings of the 48th Annual Meeting of the Association of Life Insurance Medical Directors 24:157-178, 1938.

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MINNEAPOLIS, MINNESOTA, SEPTEMBER, 1942

SURGERY IN WARFARE

In the last war one of the most notable additions to our stock of surgical knowledge consisted of the wide acceptance and utilization of the principle of débridement.* We learned much of the course of anerobic infections, too, in the trench warfare period prior to the American participation and found that to be effective the use of antitetanic serum had to be repeated before secondary operations were undertaken. Carrel-Dakin irrigation was used extensively and hailed as a real contribution to the management of infected wounds, but it has since fallen largely into disuse. Plastic surgery received considerable impetus and the introduction of the pedicled tube graft by Gillies was a definite improvement.

In the intervening two decades many improvements and discoveries have been made which should tend to increase efficiency in the treatment of war injuries. The bacteriostatic action of the sulfa group is one of these; another is the development of the Orr closed technic in the treatment of compound fractures of the extremities, known and tried in a limited way during World War I but now widely recognized and used. Polyvalent serums for prophylaxis and treatment of infections by gas gangrene organisms have been made available in recent years and while they lack the specificity of the antitetanic serums they are at least relatively useful and should reduce the incidence of that type of infection. The use of dyes in the open treatment of burns has greatly simplified the handling and produced better results in this class of injuries. Another important advance has been in the storage of blood plasma for the treatment of the shock which is more common today than ever in battle and air raid injuries among civilians due to the widespread use of enormous amounts of high explosive in limited areas.

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*The term débridement itself is a misnomer as was pointed out by the late Joseph A. Blake, since the word literally means "scraping" and should be replaced by the word épluchage, meaning "cutting out." It is unfortunate that no adequate English equivalent has been found.

Whether the present conflict will develop any epoch making advances in medicine or surgery is problematical, for the very nature of all-out warfare makes deep inroads into the personnel and routine of laboratory research. But the medical officer in the armed forces today is better equipped than ever by training and the facilities at his disposal to meet the situation as it confronts him. With these, in addition to the lessons learned from the past and the benefits of improved organization he will render a good account of himself and results, in spite of the exigencies with which he will have to contend, will be highly creditable.

G. C.

WAR AND CHILDREN

We are at war. The mind and the body of the nation is assuming new duties hourly so that our country will not fail to win. The complacence of our every day lives has necessarily been sacrificed. Young men are actively fighting, fathers are working overtime to build the war machines, and mothers are making adjustments adequately as they are needed, doing what is essential and banishing what is non-essential in the home. But what about our children? Shall they be pushed to the background or shall we find time to give them good care, in spite of the heavy burden placed upon us by the war. By all means, let us do the latter, not by writing extensive programs which read well and lead to little action, but instead by concentrating repeatedly on the following plan.

We must promote periodic health examinations and see to it that the family physician makes it his duty to follow all the children with defects until corrections have been made. The records of the selective service examinations have revealed that much can be done to improve the physical condition of our children.

We must see that children receive foods for their nutritive value and omit luxuries. Food rationing will make mothers more eager to learn new and simple diets for maintaining the health of their children.

We must see that children are immunized against contagious diseases with their dangerous complications. All of us will now coöperate by approving methods for the prevention of disease; the opposition has no place in war time.

A. V. S.

BULBLESS INFLATION TECHNIC IN BLOOD PRESSURE DETERMINATION

There are many factors that make for variability in blood pressure observations. Even the smallest of these deserves consideration. In borderline cases, the difference of a few points may determine the acceptance or rejection of a life insurance prospect. We have such a situation when the diastolic is found to be roughly around 90, and the accuracy of reading the tone change and sound disappearance a trifle above or below this figure becomes exceedingly important. The intermittent one-bulb-at-a-time cuff inflation method is disturbing to sensitive subjects and is one of these factors that we have in mind.

Nearly all physicians' offices have compressed air apparati. In medical buildings such equipment is universal, the air being piped from a central compressor to convenient wall outlets in the respective units. The same tubing and end piece that supplies compressed air for sprays and nebulizers may also be used to inflate the arm band in blood pressure readings. A chair and a convenient arm rest, preferably on the subject's left, completes the set-up.

After wrapping the sleeve around the arm in the usual manner the nozzle end of the air hose is inserted in the tubing leading to the air bag. If this be first supplied with a female coupling, the procedure is even smoother. We have used this method for many years and believe it reduces the apprehension arising from jerky bulb inflation with its accompanying "pht-pht" sounds. If we can eliminate the cardiovascular instability of psychogenic origin we may be sure of greater accuracy.

A. E. H.

SURGEONS' CONGRESS SCHEDULED FOR CLEVELAND, NOVEMBER 17 TO 20

The 1942 Clinical Congress of the American College of Surgeons, originally scheduled for October at the Stevens Hotel, Chicago, which was taken over August 1 by the United States Army Air Corps, will be held in Cleveland, with headquarters at the Cleveland Public Auditorium, from November 17 to 20, according to an announcement from the College headquarters in Chicago. The twenty-fifth annual Hospital Standardization Conference sponsored by the College will be held simultaneously.

The program of panel discussions, clinical conferences, scientific sessions, hospital meetings, and medical motion picture exhibitions at headquarters, and operative clinics and demonstrations in the local hospitals and Western Reserve University School of Medicine, has been centered around the many medical and surgical problems arising out of the prosecution of an all-out effort to win the war, emphasizing the needs of the rapidly expanding medical services of the Army and the Navy, and consideration of special problems related to the increasing activities for civilian defense.

TRANSACTIONS OF THE MINNEAPOLIS ACADEMY OF MEDICINE

Founded January 17, 1920

Stated Meeting Held at the Minneapolis Club Thursday, April 9, 1942

Vice-President, Dr. R. L. Wilder, in the Chair

REPORT OF UNUSUAL REACTIONS IN MOTHER AND NEWBORN IN A CASE OF DIABETES MELLITUS

A. E. Cardle, M.D.

Tonight I wish to report an interesting case of diabetes mellitus and pregnancy which I believe is worth discussing.

The condition itself is familiar to you all, but it is one in which we need to review our experiences from time to time. This case brings out certain features which are not the typical reactions expected, which I hope will serve to emphasize certain points in the treatment of this condition which must constantly be kept in mind.

A white woman, age 21, had suffered from diabetes mellitus since the age of seven years. She had been treated by private care until about ten years ago when she was admitted to the diabetic dispensary of the Minneapolis General Hospital. Her development at this time had been that of a perfectly normal girl, with the exception of her diabetes. She was very intelligent and understood the problems of a diabetic as well as any patient I have ever seen. She had come through the periods of regular insulin and protamine insulin, and knew how to regulate her diet and make the ordinary home laboratory tests.

She was followed in the Out-patient Department until about three years ago, when because of occupation she was unable to have regular medical care.

I first saw her on April 16, 1941, and she stated that since the last time I had seen her about three years ago she had become married and at the present time was about four months pregnant. She was in the hands of a good obstetrician, and they both desired that her diabetic condition be followed during her course of pregnancy. Accordingly, an examination was given, and both insulin and diet were slightly modified to meet the situation. She was given very careful instruction about the care of the diabetic during pregnancy, and it was explained to her that she might expect some variations in her diabetic condition and that at the time of delivery certain complications might arise which would have to be taken care of by both an internist and a pediatrician. Her course was uneventful until she was about 6½ months pregnant, when because of a short attack of pyelitis and a subcutaneous infection from an insulin needle it was necessary to hospitalize her for about two weeks. This was done, and interestingly enough her tolerance definitely changed. Instead of using 65 units of insulin daily she now required, after the infection was over, 120 units of insulin daily, on a diet of 165 carbohydrate, 65 protein, and 80 fat.

It was with considerable difficulty that she was controlled for the next two months, and only by frequent and continuous observations of blood and urinary sugar and insulin changes was she kept under control. In view of the circumstances it was decided to deliver at 8½ months by cesarean section. She was admitted to the hospital, and examination at that time revealed a blood sugar of 250 milligrams, a urine of 2+, and the taking of 130 units of insulin a day. Two days later a cesarean section was performed under local anesthesia, 40 units of insulin being given prior to delivery. A quick section delivered a normal baby, who was resuscitated by Dr. Platou (Dr. Platou will report on the reactions of the child, and management, following this report). Following delivery she was taken to her room in excellent condition. A blood sugar, however, revealed only 45 milligrams. At noon she was given orange juice and milk toast, and no further insulin was given that day. In the evening she had a meal of tea and toast. The urine was free of sugar the entire time. The next day she did not feel as well, but the condition appeared satisfactory although the urine was still sugar free. At 5:00 P. M. that afternoon she went into an insulin reaction, and her blood sugar was 44 milligrams. I again emphasize that no insulin of any kind had been given during these two days. An injection of 1,000 cc. of 5 per cent glucose was given, to which she reacted immediately. The blood sugar rose, and she was discharged on the tenth day on a diet of 125 carbohydrate, 80 protein, 100 fat, and 95 units of insulin.

Discussion

It is the purpose of this report to bring out the reactions in the diabetic condition, not only before but also after delivery. The condition before delivery is known to you all. This case, because of the pyelitis and change in tolerance, was somewhat more difficult to handle than the ordinary one, but the reactions following delivery are somewhat unusual inasmuch as this patient went into hypoglycemia instead of the usual hyperglycemia which is often experienced when the compensatory pancreatic function of the child is removed.

Two explanations for this occur. First, there may be something disturbing the absorption of the insulin in these cases of diabetes. This patient had some swelling of the feet, but there was no marked swelling of the legs and thighs. She was, however, administering the insulin into the leg, and here may be one of the problems in the control of this type of case. There may be a pooling of the insulin because of the lack of absorption, especially in some of these cases which require large doses of insulin, and at the time of delivery when the child is removed there is a sudden release of this pooled insulin into the system of the mother, causing the sudden reaction of hypoglycemia as here discussed. I have been unable to find many references to this in the literature. The other explanation is the effect of the mother's pituitary on the general diabetic condition during pregnancy. It is well known that the pituitary during pregnancy enlarges about three times its size, and it may be that there is a relationship between the pituitary and the pancreas to explain this sudden reaction at the time of delivery. As yet this is a theoretical consideration, and I am somewhat more inclined toward the preceding explanation. It would be my impression that in such cases insulin not be administered in the leg but be given in the arm.

In conclusion I merely wish to stress the importance of the care of the diabetic patient during pregnancy and to emphasize the importance of not always expecting the typical reactions in the mother and child at the time of delivery. It may be the opposite of what is expected, particularly in the mother. The report of the reaction in the infant will be given by Dr. Platou.

HYPOGLYCEMIC SHOCK IN AN INFANT BORN OF A DIABETIC MOTHER

E. S. Platou, M.D.

A case of persistent and striking hypoglycemia in an infant born of a diabetic mother is presented. The mother, a severe diabetic, having received 40 units of insulin two hours before, developed symptoms of hypoglycemia with cyanosis at the time of delivery by cesarean section (two weeks before term).

The infant was difficult to resuscitate and 60 cc. of 10 per cent glucose was given intravenously during the period of resuscitation. Blood sugar taken two hours after birth was 50 mgm. and in eight hours dropped to 36 mgm.

The subsequent course is illustrated graphically in Figure 1.

Cyanosis, persistent even when in oxygen; restlessness, rapid respiration, and occasional twitching were the presenting symptoms. On the third day respiration apparently ceased twice but was resumed following the use of respiratory stimulants. Continuous intravenous drip of glucose and small doses of adrenalin finally controlled the symptoms after five days of strenuous therapeutic efforts.

Hypoglycemia in infants born of diabetic mothers has been attributed to compensatory hypertrophy of islet tissue. Hypoglycemic shock as it occurred in this case on discontinuance of

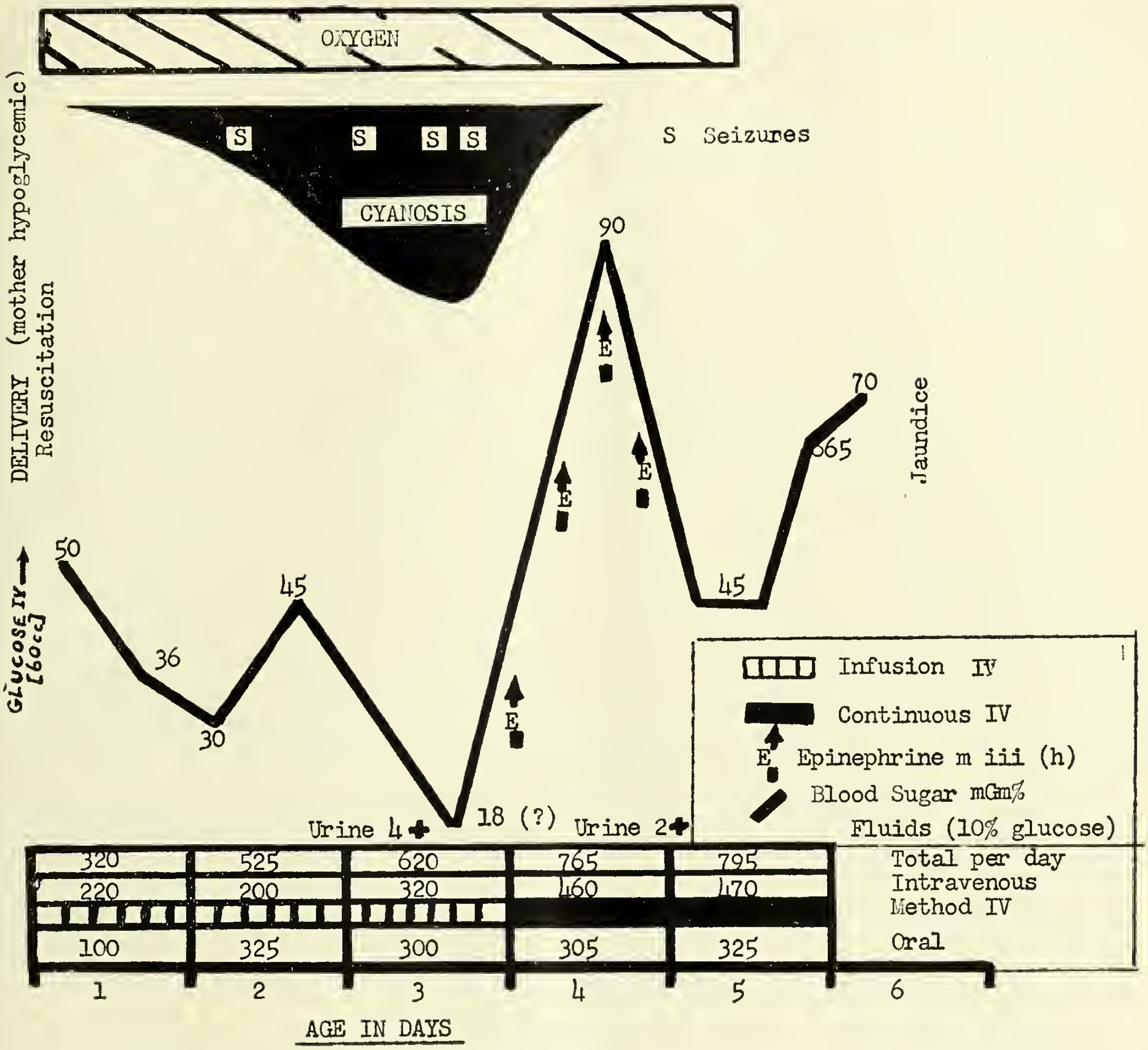

Fig. 1.

intravenous glucose is extremely rare and usually fatal. Fatal cases have been reported in which the islet tissue was found to be normal and advanced differentiation of the pituitary was demonstrable.

Sisson in a series of 65 cases showed that 43 per cent of the babies presented symptoms and that the mortality was 18 per cent. Cerebral anoxia appears to be the cause of alarming symptoms. He stresses the need for oxygen and the infrequent need for glucose unless the mother has received insulin shortly before delivery.

Priscilla White believes that dietary and insulin therapy are not adequate in the mothers and that substitutional estrogen and progesterone will prevent the accidents of pregnancy in a diabetic.

It is probable that a combination of these factors may have been operative in the case here presented. The baby, now 7 months old, is perfectly well.

Discussion

Dr. C. J. Ehrenberg: The pituitary factor in diabetes has been, of course, definitely recognized but as yet, as with other pituitary factors, is not understood.

About a year ago Cantila reported the results of treating diabetes mellitus in the intramenopausal or postmenopausal woman through the use of steroids. Based on the hypothesis that steroids depress pituitary function, rather large doses of estradial or progesterone or both were used in the treatment of 40 patients. Diet was disregarded and no insulin was used. In every case the blood sugar levels which were determined fractionally returned to normal after a number of weeks of treatment.

These observations show beyond a doubt the inter-relationship of pituitary and pancreatic function but how they tie up in diabetes is not known. If pregnancy is superimposed on the diabetes an even more confusing endocrine picture would seem to be obvious. Only more time and many more studies will eventually give us a more rational basis for treatment with the hormones.

From the standpoint of the baby, the obstetrician should always anticipate an immediate postdelivery hypoglycemia regardless of whether or not the mother has had her diabetes well controlled. The hypoglycemia can easily be treated through the immediate administration of dextrose. Therefore, I believe it should be routine to take a blood sugar determination on the baby immediately after delivery in the case of every diabetic mother. It is in this way that we will avoid some of the severe postnatal tragedies.

DR. ROY SWANSON: I enjoyed this paper very much. It demonstrates the close coöperation that is necessary between the obstetrician, internist and pediatrist. This baby could have been lost very easily.

During the last few years it seems that most obstetricians accept cesarean section as the method of choice in the delivery of the patient with diabetes. I still think that obstetrical indications are as important in this condition as the disease itself. Local anesthesia, of course, is indicated.

DR. JOHN L. MCKELVEY: These are extraordinarily interesting patients because there are new angles that are appearing in regard to the background of the disturbances. They represent a clinical case of a type which we have long since learned to be somewhat leery of. I think our whole idea of handling the diabetic patient has changed. It has changed because we are recognizing diabetics in different stages. We are getting the story of parents who have diabetes and are making diagnoses by sugar tolerance tests so that the average diabetic patient is much less of a clinical obstetrical problem than she used to be.

What we have had impressed upon us very much is that the unstable diabetic or, as we have learned to call it, the childhood type of diabetes, in association with pregnancy is a dreadful risk. In the first place, those people should not become pregnant. I think the physician in charge of the mother should explain why he followed this patient through puberty and then allowed her to become pregnant.

They have little in the way of glycogen stores to come and go on and that seems to explain the instability of the diabetes. The question of what happens to these patients at operation is also changed. I would be interested in hearing the background of the choice of anesthetic. Cesarean section is ideally done under local anesthesia but we have also changed our ideas of handling the diabetic surgical patient. All of you can remember these patients who were anesthetized and at 15 minute intervals blood was taken and blood sugar determined. We were terrified of them but now with the use of local anesthesia and with the use of adrenalin, accompanied by the use of barbiturates we are not now afraid of the immediate course.

We have not been in the habit of doing any preparation of these patients in the way of an addition of insulin outside of their normal requirements. A preparatory sedative and the use of the local anesthesia with adrenalin seems to be satisfactory.

I think Dr. Platou has something more to say about the treatment of the babies. It has been our policy to routinely administer glucose to these children. I see no reason for objection to that. The glucose does no harm and in those babies who show varying degrees, it is true, of hypoglycemia it obviously acts as a protective measurement. I have never seen hypoglycemic convulsions in the newborn. This case presents a very unusual condition.

DR. A. E. CARDLE: I appreciate very much the discussion which this case has provoked. Glandular relationship, of course, while yet theoretical, is very interesting and undoubtedly we will learn a great deal more about it in the future.

In reply to Dr. McKelvey's question, as I said, I had no opportunity to observe this patient during the past three years. She had been warned against becoming pregnant but this situation does arise in spite of what everyone may say. The problem in this situation was to see the mother through a successful pregnancy. The point to stress, I believe, is that we must never take the condition of the mother for granted but must constantly be on the alert, watching not only for signs of hyperglycemia but also signs of hypoglycemia which in this case might have been serious if we had not been watching her so closely.

DR. R. S. YLVISAKER: I would like to ask Dr. Platou one question. He cited one report from the literature which stated that in their opinion the use of glucose was contraindicated. It might be interesting to know, if possible, what their treatment was for this condition. There may be a very definite reason for not using glucose intravenously since we know that this would probably further stimulate the production of insulin by the already hypertrophied islet tissue in the baby.

I would be interested to know if the report cited any other measures for controlling this over-production of insulin.

DR. R. L. WILDER: There is one question I would like to ask Dr. Platou. Since it is known that hypopituitarism causes hypoglycemia and since the infant reported by Dr. Platou had a marked hypoglycemia which was not readily corrected by the administration of glucose and adrenalin, I wonder if the administration of anterior pituitary extract would be a useful adjunct in the treatment of hypoglycemia of the type reported?

DR. FRANK ANDRUS: I have examined the pancreas from two infants born to diabetic mothers and in each the hypertrophy of the islet tissue was extremely marked. The islets seemed to be several times the size of those of an adult. I am wondering if all of the infants who develop hypoglycemia have this hypertrophy of the islet tissue. We see numerous instances of spontaneous hypoglycemia in the adult in which the pancreas is entirely normal.

DR. E. S. PLATOU (closing discussion): Dr. Sisson of Boston has reported that oxygen is adequate in controlling the baby in most cases and that glucose is not necessary although it is generally not contraindicated. He feels that preoperative insulin in the mother is dangerous to the baby. Excluding this factor, however, he reports 18 per cent case fatality rate in 65 babies of diabetic mothers which seems high. Would it not be more rational to individualize and carry out therapy on the basis of blood levels in the baby?

No successful control of insulin over-production in the newborn has yet been achieved by means of hormone therapy although this seems theoretically plausible. The use of glucose in this unusual case presented seemed imperative to me and I believe was a life-saving measure.

THE REMOTE EFFECTS OF HYPERTENSIVE TOXEMIAS OF PREGNANCY

Inaugural Thesis

JOHN AMBERG HAUGEN, M.D.

Summary

Ninety-four (94) patients having had hypertensive toxemia of pregnancy treated at the University Hospital in the years 1930 to 1935 were reëxamined five to ten years later. Of the 94, only 47, or 50 per cent, were alive with normal blood pressures. Of the remaining 47, 36 were alive with permanent hypertension, and 11 deaths had occurred. Seven deaths were from arteriolosclerosis. Consequently, 43 patients, or 45.74 per cent were known to have permanent hypertension following a hypertensive toxemia of pregnancy.

It was reported that the five to ten year mortality rate among the arteriolosclerotic group was 23.40 per cent. Four of the eleven deaths, or 8.51 per cent, were from direct causes other than the hypertensive disease. This left seven, or 14.8 per cent, for the five to ten year corrected mortality rate from the hypertensive disease.

The reëxamination of these patients was done in most instances by the Obstetric Staff at the University Hospital. The study was made possible by the coöperation of local physicians throughout the state.

DR. CHARLES E. STANFORD: Permanent loss of vision may occur in pregnancy as a complication of the hypertensive toxemias. In such cases the ocular findings are usually postneuritic optic atrophy. At present there are nine persons known to the State Bureau for Aid to the Blind who have such a history and findings. These cases fortunately are not common. The cases can be briefly related as follows:

Case 1. Toxemia of pregnancy at age 19. Total loss of vision in right eye, left retaining 20/40 central vision, but with incapacitating contraction of the visual field. Bore a second child seven years later with no further visual loss.

Case 2. Blind at age 25, four days after labor. Retained 20/70 vision with 15 degree field in right eye, left eye, 1/200. She had a "stroke" in 1930 and survived. In 1936 systolic pressure was reported as 230. Fundi show seven grade of hypertensive changes and optic atrophy.

Case 3. Blind at 40, retaining light perception only. First pregnancy at 40; reported to have had eclampsia. Fundi show postneuritic optic atrophy and severe vascular changes.

Case 4. Temporary blindness during confinement with sixth pregnancy, total with seventh pregnancy at age 41.

Case 5. Blind at age 21. Retained 10/200 vision. Had severe toxemia with first pregnancy and was hospitalized for a long period under treatment for hypertension and retinal hemorrhages.

Case 6. Became blind from "nephritis of pregnancy" with ninth confinement at age 41. Retained 20/100 vision with right eye, but has contracted visual field.

Case 7. Blind at 33, one month prior to birth of fourth child. Optic atrophy of nephritis and hypertension.

Case 8. Blindness began during fourth pregnancy at age 34 and was complete before term.

Case 9. Totally blind at age 33 from neuroretinitis, supposedly a complication of puerperal sepsis.

I have been fortunate in seeing two of these patients. The retinal vascular changes and the postneuritic optic atrophy were present in both. Modern prenatal care and management of labor will propably eliminate this cause of blindness in the future.

Dr. C. J. Ehrenberg: I had hoped that Dr. McKelvey would discuss this presentation for it is due to his effort that the subject of arteriolosclerosis following toxemias of pregnancy has been so clearly impressed upon us. Because of our relationship I have been fairly close to Dr. Haugen's work and although he neglected to mention it I know he intends this to be in the nature of a preliminary report.

Within the last year Chesley and his collaborators in Jersey City, New Jersey, have presented rather complete reports on this subject in both the convulsive and non-convulsive groups of toxemias of pregnancy studied after a period of five years. In the non-convulsive group at the end of five years roughly 45 per cent had hypertension. If one normal pregnancy had occurred in the interval only 12 per cent were hypertensive but if one toxemic pregnancy had occurred in the interval 65 per cent were hypertensive. If two pregnancies had occurred in the interval both of which were normal only 8 per cent were hypertensive but if both pregnancies were toxemic 80 per cent were hypertensive. This study added to those of previous authors would certainly indicate the extreme care with which the toxemic mother should be studied postpartum. The presence of even a mild arteriolosclerosis would seem definitely to contraindicate future pregnancies. This has further support if one examines the figures of Chesley as to the fruitfulness of the subsequent pregnancies.

Subsequent pregnancies occurred 247 times in 200 posttoxemic women terminating in a maternal mortality of 2 per cent. In 203 of these pregnancies progressing as far as 24 weeks, 46 per cent were toxemic. Of the 247 pregnancies 190 or 77 per cent terminated with live births, 5 per cent were still-births and 18 per cent were abortions. These figures would indicate that productivity is considerably lowered in the posttoxemic mother with hypertension, although no figures limited to the hypertensive mother are given.

Dr. Haugen, I know, is going to continue his work and I hope one phase will include a study of the fruitfulness of pregnancy in the definitely hypertensive posttoxemic woman. If productivity in this group can be shown to be considerably lessened then even more definite support is given to the principle of pregnancy prevention in the hypertensive woman.

Dr. Thomas Lowry (by invitation): I would like to ask Dr. Haugen in how many of these patients he has been able to find evidence that they had hypertension or a predisposition to it before their toxemia of pregnancy. How many of the patients who ended up with hypertension would have developed it even without their pregnancy? How many had familial histories suggesting that they may have been prehypertensive individuals?

Dr. John A. Haugen: I would like to thank the discussants for their remarks.

The part that a toxemia of pregnancy plays in the etiology of arteriolosclerosis is not known. Several factors have been investigated in this connection. A recent paper by Peckham demonstrates a relationship between the length of time a hypertension is carried before delivery and the incidence of permanent hypertension. Certainly the degree of blood pressure elevation in a toxemic pregnancy seems unrelated to the incidence of permanent hypertension. Eclampsia, the most severe of the acute toxemias, is followed by fewer permanent hypertensions than is mild preëclampsia. It is our intention to continue our analysis of post-toxemic material at the University Hospital. The influence of heredity must be remembered when thinking in terms of an etiologic relationship between the acute toxemias and permanent hypertensive disease.

Ernest R. Anderson, M.D., *Secretary.*

Book Reviews

Psychological Effects of War on Citizen and Soldier, by R. D. Gillespie, M.D.; 251 pages. New York: W. W. Norton & Company.

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Devastating and horrible as are the effects of modern warfare on civilization, mankind will nevertheless derive many benefits from its experience. This is particularly true in the field of psychological medicine. Various psychopathological concepts that have been advanced in recent years are now being tested on a grand scale.

A most timely and informative book on the psychological effects of modern warfare on armed forces and on civilian population, based upon lessons of experience, is now available. Written by one of England's outstanding psychiatrists and coauthor of one of our leading textbooks on psychiatry, this book should prove to be a guide of inestimable help to us in this country in formulating plans to maintain civilian morale as well as in assisting us to keep down the incidence of mental disorders in our fighting forces.

This book is not a dry study of statistics but rather a dynamic, interesting and colorful presentation which shatters many old misconceptions and embraces new hopes and ideas. It discusses our changing concepts in psychoneuroses and vividly illustrates how constitutional and social factors contribute to the development of this condition. "With few exceptions," he has found that "the patients present mainly the same problems as in peace time." He stresses the need of supplying immediate treatment to those who "break down" and reports what measures the English have employed in this connection.

Invaluable experience gained by our neighbors overseas are contained in this remarkable study. General practitioners and social workers as well as military men and psychiatrists can derive much worthwhile information from its contents.

Pain, Sir Thomas Lewis. New York: The Macmillan Company; 192 pages, illustrated.

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The value of the work by Sir Thomas Lewis on pain inheres in the circumstance that it was done on the human subject; hence the application of the conclusions to clinical problems is direct and immediate.

The experimental methods employed and the evidence adduced from observations of patients under several and particular situations are of the simplest. The reasoning is close, particularly when concerned with the relations of ischemia and somatic pain, but sufficiently broadbased to be readily acceptable. Lewis' studies of visceral pain have been interrupted by the war, but those from which deductions may be drawn have been included. Charts and diagrams are not numerous, but those reproduced are clear and adequate. The writing style is effortless, not elaborate, with the usual English simplicity of word use and construction. The bibliography is comprehensive and the index is detailed.

News Items

Dr. Thomas L. Hawkins, physician and surgeon of Helena, Montana, for the past 17 years, has been commissioned as a lieutenant commander in the naval reserve. He will be stationed at the naval hospital, Bremerton, Washington.

Dr. Ray Lemley, Rapid City, South Dakota, is now a captain in the Army medical air corps.

Drs. Mary Soules and William Roemmich have rejoined the North Dakota state health department after having attended graduate schools in the east. Dr. Soules obtained a master of public health degree from the Harvard School of Public Health and Dr. Roemmich was granted the same degree by the Massachusetts Institute of Technology.

Dr. George Schatz, former West Fargo (North Dakota) physician, has been advanced from captain to major in the Army medical corps.

Dr. J. W. Craig, Circle, Montana, is the new president of the Montana Public Health Association. Miss Leila McDonald, Missoula, is vice-president and Dr. B. K. Kilbourne, Helena, secretary.

Dr. David Gaviser, Princeton, Minnesota, has received his commission as first lieutenant in the Army medical corps.

Mrs. P. E. Logan, Great Falls, was named president-elect of the Woman's Auxiliary to the Montana State Medical Association at the annual meeting of the group in Missoula recently.

Dr. Francis W. Paul, Big Timber, Montana, has been commissioned a first lieutenant in the Army medical corps.

Dr. A. R. Clauser of Albuquerque, New Mexico, formerly of Canistota, South Dakota, has joined the Army medical corps as a captain.

Dr. George F. Parke, formerly of Denver, is on the staff of the Northern Pacific Beneficial Association, Glendive, Montana.

Dr. Lyle V. Berghs, Owatonna, Minnesota, has enlisted in the Army medical corps as a first lieutenant.

Dr. Earl Wood of Mankato, formerly of the staff of Harvard University medical school, is now at the Mayo Clinic where he is engaged in medical research in aeronautics for the government.

Dr. L. P. Martin, Missoula, Montana, is now a captain in the Army medical corps.

Dr. E. G. Knight, formerly of Randall, is now practicing in Swanville, Minnesota.

Dr. C. J. Holmberg, Badger, Minnesota, is in Camp Custer, Michigan, where he heads an eye, ear, nose and throat division of a new medical corps unit.

Dr. Warren Argetsinger, Pipestone, Minnesota, is now in Ft. Crook, Nebraska, where he is serving in the Army medical corps.

Dr. R. N. Bowers, Maceppa, Minnesota, has enlisted in the Army medical corps.

Dr. M. E. Lenander, St. Peter, Minnesota, has reported to Payne Field, Everett, Washington, for service in the Army medical corps.

Dr. V. W. Carlsen, Blooming Prairie, is a captain in the medical division of the Army air corps.

Dr. Otis Marsh who has been associated with Dr. W. E. Macklin in Litchfield, Minnesota, the past several months, has been called for active duty in the Army medical corps.

Dr. Dan R. Bennett, recently of Detroit Lakes, Minnesota, and at one time a staff member of Miller Hospital in St. Paul, has removed to Livingston, Montana, and become associated with Dr. Paul L. Greene.

Dr. L. F. Hall, city and county health officer at Helena, Montana, resigning by reason of ill health, will be succeeded by Dr. L. D. Fricks, of Seattle, Washington, a former Montanan.

Dr. Donald W. Fawcett who, with his father and two brothers, has practiced medicine at Devils Lake, North Dakota, for the past three and one-half years, has reported for duty in the Army medical corps at Vancouver Barracks, Washington.

Dr. F. J. Hill of Bismarck, North Dakota, acting state health officer, after attending a meeting of the state maternal and child welfare committee at Grand Forks, discussed with the members of that city's council the proposal for establishment of a full-time public health unit in the county.

Lt. Comm. Douglas Campbell, in charge of Wold-Chamberlain naval air base at Minneapolis, has announced that the location of the new 250-bed hospital serving it will be the three double-length city blocks along 59th Street and the present north boundary of the airport.

First Lieutenant E. T. Keller of Rugby, North Dakota, Flight Surgeon with the 72d Bombing Squadron of the army, is stationed in Hawaii, a post which he writes JOURNAL-LANCET by clipper mail is an agreeable one. He is to be reached through the U. S. Army Postal Service, c/o San Francisco postmaster.

The American College of Physicians has announced its 27th annual session to be held in Philadelphia, April 13 to 16, inclusive, 1943. Heretofore, the College has held a five-day session, but in the interest of conserving time and expense of its members, the program will be condensed into four days, Tuesday through Friday. Dr. James E. Paullin, Atlanta, as president of the College, will have charge of the program of General Sessions and Lectures. Dr. George Morris Piersol, Philadelphia, as general chairman, will be responsible for the program of Hospital Clinics, Panel Discussions, local arrangements, entertainment, etc. The general management of the session and technical exhibits will be handled by the executive secretary, Mr. E. R. Loveland, 4200 Pine Street, Philadelphia. Other medical societies are urged to avoid conflicting dates, for our mutual benefit.

LIST OF PHYSICIANS LICENSED BY THE MINNESOTA STATE BOARD OF MEDICAL EXAMINERS ON JULY 10, 1942

BY EXAMINATION

Name	School	Address
Albrecht, H. H.	Marquette, U., M.D. 1942	Floodwood, Minn.
Andersen, Howard Arne	U. of Minn., M.B. 1942	3904 - 13th Ave. S., Minneapolis, Minn.
Anderson, William Hodgson	U. of Minn., M.B. 1941, M.D. 1942	Box 110, Alexandria, Minn.
Bacon, Warren Wright	Col. of Med. Evang., M.D. 1942	N. P. B. A. Hospital, St. Paul, Minn.
Baker, Charles Edward	Northwestern, M.B. 1941, M.D. 1942	Fergus Falls, Minn.
Barton, Robert Linhart	U. of Mich., M.D. 1938	Mayo Clinic, Rochester, Minn.
Bellville, Titus Philemon	Marquette U., M.D. 1941	924 Essex S. E., Minneapolis, Minn.
Bentson, James Hoffman	U. of Minn., M.B. 1942	Ancker Hospital, St. Paul, Minn.
Bergan, Robert Otto	U. of Minn., M.B. 1942	Mpls. General Hospital, Minneapolis, Minn
Bixler, Louis Clifford	Indiana U., M.D. 1937	University Hospitals, Minneapolis, Minn.
Ceder, Elmer Theodore	U. of Minn., M.B. 1929, M.D. 1930	Mayo Clinic, Rochester, Minn.
Chalmers, James Hugh	U. of Minn., M.B. 1941, M.D. 1942	J. C. Medical Center, Jersey City, N. J.
Colton, Warren Alfred, Jr.	U. of Minn., M.B. 1941, M.D. 1942	U. S. Veterans Adm., Kecoughtan, Va.
Cress, Paul Cronan	U. of Minn., M.B. 1942	Ellsworth, Minn.
Duerr, Eleanor Elizabeth	U. of Minn., M.B. 1942	Mpls. General Hospital, Minneapolis, Minn.
Dwinnell, Leonard Anthony	Northwestern U., M.B. 1941, M.D. 1942	569 Portland Ave., St. Paul, Minn.
Evensta, John Berg	Geo. Washington U., M.D. 1941	Mpls. General Hospital, Minneapolis, Minn.
Ferguson, Donald John	U. of Minn., M.B. 1942	4912 Penn Ave. S., Minneapolis, Minn
Gilbert, Jarvey	U. of Minn., M.B. 1942	Fresno Co. Hospital, Fresno, Calif.
Graham, Robert Judson	Northwestern U., M.B. 1940, M.D. 1941	Mayo Clinic, Rochester, Minn.
Greenberg, Albert Joseph	U. of Minn., M.B. 1942	1329 Lincoln Ave., St. Paul, Minn.
Hagen, Kristofer	U. of Minn., M.B. 1942	Wm. J. Seymour Hospital, Eloise, Mich.
Hall, Betty Julia	U. of Minn., M.B. 1940, M.D. 1941	515 Queen Ave. N., Minneapolis, Minn.
Hallin, Roger Paul	U. of Minn., M.B. 1942	3611 Cedar Ave. S., Minneapolis, Minn.
Hayford, William D.	U. of Minn., M.B. 1942	Wesley Memorial Hospital, Chicago, Ill.
Hill, Earl	U. of Minn., M.B. 1942	1800 Vincent Ave. N., Minneapolis, Minn.
Jack, Laurine Davison	U. of Minn., M.B. 1942	Shreveport Char. Hosp., Shreveport, La.
Johnson, Tennyson Gates	U. of Minn., M.B. 1942	1326 St. Antoine St., Detroit, Mich.
Kirkeeng, Melvin J.	U. of Minn., M.B. 1942	Orange Co. Gen. Hospital, Orange, Calif.
Lueck, Wallace Wilson	U. of Minn., M.B. 1942	Wayne Co. Hospital, Eloise, Mich.
Lund, J. Benjamin	U. of Minn., M.B. 1942	Emanuel Hospital, Portland, Ore.
Macaulay, Warren Lowell	U. of Minn., M.B. 1942	San Bernardino Co. Charity Hospital, San Bernardino, Calif.
Mann, Frank Daniels	U. of Minn., M.B. 1942	Strong Mem. Hospital, Rochester, N. Y.
Marr, George Edward	U. of Louisville, M.D. 1936	Mayo Clinic, Rochester, Minn.
Martinson, Elmer James	Col. of Med. Evang., M.D. 1942	Wayzata, Minn.
McCormick, Donald Phillip	U. of Minn., M.B. 1941	Mpls. General Hospital, Minneapolis, Minn.
McEvoy, Joseph Peter	U. of Minn., M.B. 1942	Ancker Hospital, St. Paul, Minn.
Montgomery, George Edmond Jr.	U. of Minn., M.B. 1941, M.D. 1942	Mayo Clinic, Rochester, Minn.
Murray, Nelson Arnold	Tulane U., M.D. 1939	Mayo Clinic, Rochester, Minn.
Mussey, Robert Delevan	U. of Minn., M.B. 1942	Cincinnati Gen. Hospital, Cincinnati, Ohio.
Olson, Burton G.	U. of Minn., M.B. 1942	Orange Co., Hospital, Orange, Calif.
Patterson, Robert Bruce	U. of Minn., M.B. 1942	St. Mary's Hospital, Duluth, Minn.
Perkins, Marsh Olin	U. of Minn., M.B. 1941, M.D. 1942	2190 Sargent Ave., St. Paul, Minn.
Peterson, Willard Everett	U. of Minn., M.B. 1942	3245 - 1st Ave. S., Minneapolis, Minn.
Posch, Joseph Louis	U. of Minn., M.B. 1942	Detroit Receiving Hospital, Detroit, Mich.
Poirier, Ralph Alexander	U. of St. Louis, M.D. 1942	Detroit Mount Carmel Mercy Hospital, Detroit, Mich.
Preston, Lewis Frederick	Baylor U., M.D. 1939	Mayo Clinic, Rochester, Minn.
Ralph, James Robert	Marquette U., M.D. 1942	617 Portland Ave., St. Paul, Minn.
Ryan, Bernard F.	U. of Oregon, M.D. 1936	Mayo Clinic, Rochester, Minn.
Schneider, Robert Arnold	U. of Minn., M.B. 1942	Mpls. General Hospital, Minneapolis, Minn.
Sterner, John Joseph	St. Louis U., M.D. 1942	171 S. Lexington Pkwy., St. Paul, Minn.
Stowe, Lyman Maynard	Yale U., M.D. 1938	University Hospitals, Minneapolis, Minn.
Taylor, Gerald Joseph	U. of Minn., M.B. 1941, M.D. 1942	910 - 8th Ave. N., St. James, Minn.
Turner, James Lynn	Northwestern U., M.B. 1940, M.D. 1941	Mayo Clinic, Rochester, Minn.
Van Gordon, Donald James	U. of Minn., M.B. 1942	1024 A St., Crookston, Minn.
Van Rooy, George Tardiff	U. of Minn., M.B. 1941, M.D. 1942	4213 Sheridan Ave. S., Minneapolis, Minn.
Walker, George Lewis	U. of Minn., M.B. 1941	635 W. Broadway, Winona, Minn.
Wallace, George Thomas	Rush Med. Col., M.D. 1938	Mayo Clinic, Rochester, Minn.
Watkins, Dale Baxter	U. of Minn., M.B. 1942	St. Luke's Hospital, Duluth, Minn.
Wert, Alvin DuBois	U. of Rochester, M.D. 1941	Mpls. General Hospital, Minneapolis, Minn.

BY RECIPROCITY

Hawley, Geo. Maxwell Blackstock II	Johns Hopkins U., M.D. 1940	Northern Pump Co., New Brighton, Minn.
Nester, Hansford Dorsey	U. of Maryland, M.D. 1936	Mayo Clinic, Rochester, Minn.
Spearing, John Henry, Jr.	U. of Chicago, M.D. 1938	Gopher Ordnance Co., Rosemount, Minn.

NATIONAL BOARD CREDENTIALS

Rogers, Howard Milton	U. of Pittsburgh, M.D. 1935	Mayo Clinic, Rochester, Minn.
Wass, Harold E.	U. of Buffalo, M.D. 1938	1039 Lowry Med. Arts Bldg., St. Paul, Minn.

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Physicians, clinics and hospitals interested in obtaining copies of the "Sperm" monograph, may write to the Medical Research Division, Schering Corporation, Bloomfield, N. J.

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Physicians who anticipate difficulty in finding their cars during blackouts will be interested in the new automobile identification plates which have been issued by the Medical and Surgical Relief Committee of America. They are made of washable plastic board with the letters "M.D." conspicuously imprinted in white against a black background. The Committee's emblem, a modified caduceus, is also imprinted on the plate.

The size is 6x12⅝ inches. The price, $1.50. Plates are available at Committee headquarters, 420 Lexington Avenue, New York, New York.

PEPTIC ULCER FILM AVAILABLE

There is now available for free showings before groups of physicians the first complete movie film on peptic ulcer, in color and with sound track.

The film is entitled "Peptic Ulcer" and was produced under the direction of the Department of Gastroenterology of the Lahey Clinic of Boston. The American College of Surgeons has awarded its seal of approval to the film.

Running time of the film is 45 minutes, 1600 feet of 16 mm. film, and covers a presentation of the following problems of peptic ulcer: Pathogenesis, diagnosis, treatment, pathology, complications, including obstruction, hemorrhage, and perforation, gastric ulcer, surgery and jejunal ulcer.

Arrangements for a showing of the film may be made by writing to the Professional Service Department of John Wyeth and Brother, Inc., Philadelphia, who will provide projection equipment, screen, film, and operator for medical groups, without charge.

The JOURNAL LANCET

Minneapolis, Minnesota
October, 1942

Vol. LXII, No. 10
New Series

Transactions of the Montana State Medical Association

Sixty-Fourth Annual Session

Missoula, Montana
July 8, 9, 10, 1942

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COUNCILLORS

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CHARLES HOUTZ, M.D.	District No. 2	(1943)
J. H. GARBERSON, M.D.	District No. 3	(1945)
L. W. ALLARD, M.D.	District No. 4	(1945)
A. D. BREWER, M.D.	District No. 5	(1944)
E. A. WELDEN, M.D.	District No. 6	(1945)
F. B. ROSS, M.D.	District No. 7	(1943)
J. H. IRWIN, M.D.	District No. 8	(1945)
H. W. GREGG, M.D.	District No. 9	(1944)
L. G. DUNLAP, M.D.	District No. 10	(1943)
S. A. COONEY, M.D.	District No. 11	(1944)
A. R. FOSS, M.D.	District No. 12	(1944)

COMMITTEES

LEGISLATIVE COMMITTEE
HOSPITAL COMMITTEE
(3 years)

R. L. TOWNE, M.D. (1945)	Kalispell
R. W. MORRIS, M.D. (1943)	Helena
F. K. WANIATA, M.D. (1944)	Great Falls

PUBLIC INSTRUCTION AND HEALTH COMMITTEE
AND PUBLIC RELATIONS COMMITTEE
(1 year)

L. W. BREWER, M.D. (1943)	Missoula
M. A. SHILLINGTON, M.D. (1943)	Glendive
T. L. HAWKINS, M.D. (1943)	Helena

CANCER COMMITTEE
(1 year)

J. H. GARBERSON, M.D. (1943)	Miles City
R. F. PETERSON, M.D. (1943)	Butte
J. H. BRIDENBAUGH, M.D. (1943)	Billings
EARL HALL, M.D. (1943)	Great Falls
L. G. DUNLAP, M.D. (1943)	Anaconda

HISTORY OF MEDICINE COMMITTEE
(1 year)

E. D. HITCHCOCK, M.D. (1943)	Great Falls
T. F. WALKER, M.D. (1943)	Great Falls
J. H. IRWIN, M.D. (1943)	Great Falls

ORTHOPEDIC COMMITTEE AND ADVISORY COMMITTEE TO
STATE BOARD OF HEALTH
(1 year)

L. W. ALLARD, M.D. (1943)	Billings
A. D. BREWER, M.D. (1943)	Bozeman
J. K. COLMAN, M.D. (1943)	Butte
F. R. SCHEMM, M.D. (1943)	Great Falls
W. E. LONG, M.D. (1943)	Anaconda

DENTISTS, PHARMACISTS AND NURSES COMMITTEE
(1 year)

B. K. KILBOURNE, M.D. (1943)	Helena
B. R. TARBOX, M.D. (1943)	Forsyth
R. E. RYDE, M.D. (1943)	Glasgow

PROGRAM COMMITTEE
(3 years)

T. F. WALKER, M.D. (1945)	Great Falls
M. A. SHILLINGTON, M.D. (1945)	Glendive
HERBERT CARAWAY, M.D. (1943)	Billings

MEDICAL INSURANCE AND LEGAL AFFAIRS COMMITTEE
(2 each year, 4-year term)

P. E. KANE, M.D. (1946)	Butte
J. C. MacGREGOR, M.D. (1943)	Great Falls
GEORGE JESTRAB, M.D. (1946)	Havre
F. B. ROSS, M.D. (1946)	Kalispell
J. H. BRIDENBAUGH, M.D. (1943)	Billings
E. R. GRIGG, M.D. (1943)	Bozeman
A. T. HAAS, M.D. (1943)	Missoula

MEDICAL PUBLICATIONS
(1 year)

A. R. FOSS, M.D. (1943)	Missoula
A. J. KARSTED, M.D. (1943)	Butte
S. A. COONEY, M.D. (1943)	Helena

MEDICAL ECONOMICS
(3 years)

J. C. SHIELDS, M.D. (1944)	Butte
J. H. GARBERSON, M.D. (1944)	Miles City
F. F. ATTIX, M.D. (1943)	Lewistown
M. A. SHILLINGTON, M.D. (1943)	Glendive
J. P. RITCHEY, M.D. (1943)	Missoula

POSTGRADUATE
(1 year)

A. R. FOSS, M.D. (1943)	Missoula
M. B. HESDORFFER, M.D. (1943)	Missoula
A. R. KINTNER, M.D. (1943)	Missoula

FRACTURES
(1 year)

TUBERCULOSIS
(1 year)

F. I. TERRILL, M.D. (1943)	Galen
P. L. ENEBOE, M.D. (1943)	Bozeman
E. M. LARSON, M.D. (1943)	Great Falls
J. L. MONDLOCH, M.D. (1943)	Butte
W. GORDON, M.D. (1943)	Billings

ADVISORY BOARD, WOMEN'S AUXILIARY
(3 years)

EXECUTIVE COMMITTEE

E. D. HITCHCOCK, M.D.	Great Falls
W. E. LONG, M.D.	Anaconda
J. I. WERNHAM, M.D.	Billings
T. F. WALKER, M.D.	Great Falls
J. P. RITCHEY, M.D.	Missoula

INDUSTRIAL HYGIENE
(3 years)

A. T. HAAS, M.D. (1943)	Missoula
HAROLD SCHWARTZ, M.D. (1943)	Butte
J. B. FRISBEE, M.D. (1943)	Butte

MEDICAL MILITARY PREPAREDNESS AND DEFENSE ACTIVITY
(1 year)

F. L. ANDREWS, M.D. (1943)	Great Falls
R. V. MORLEDGE, M.D. (1943)	Billings
W. A. LACEY, M.D. (1943)	Havre

ROCKY MOUNTAIN CONFERENCE
(1 appointed each year, 5-year term)

T. F. WALKER, M.D. (1945)	Great Falls
T. L. HAWKINS, M.D. (1944)	Helena
H. W. GREGG, M.D. (1943)	Butte
C. H. NELSON, M.D. (1946)	Billings
J. R. SOLTERO, M.D. (1947)	Lewistown

NOMINATING COMMITTEE

F. F. ATTIX, M.D. (1943)	Lewistown
L. G. DUNLAP, M.D. (1943)	Anaconda
H. T. CARAWAY, M.D. (1943)	Billings

MATERNAL AND CHILD WELFARE COMMITTEE
(3 years)

F. L. McPHAIL, M.D. (1944)	Great Falls
D. L. GILLESPIE, M.D. (1944)	Butte
G. A. CARMICHAEL, M.D. (1943)	Butte
T. L. HAWKINS, M.D. (1944)	Helena
L. W. BREWER, M.D. (1943)	Missoula
P. L. ENEBOE, M.D. (1943)	Bozeman
E. A. HAGMANN, M.D. (1944)	Billings
R. L. TOWNE, M.D. (1944)	Kalispell
L. T. SUSSEX, M.D. (1943)	Havre
A. L. GLEASON, M.D. (1943)	Great Falls
S. A. OLSEN, M.D. (1943)	Glendive
E. A. WELDEN, M.D. (1943)	Lewistown
H. M. TEEL, M.D. (1943)	Polson

STATE INSTITUTIONS COMMITTEE

HAROLD GREGG, M.D. (1943)	Butte
W. E. LONG, M.D. (1943)	Anaconda
J. I. WERNHAM, M.D. (1943)	Billings

Minutes of the Sixty-Fourth Annual Session of the House of Delegates of the Montana State Medical Association

The Sixty-fourth Annual Session of the House of Delegates of the Montana State Medical Association was held at the Florence Hotel in Missoula, Montana, Wednesday, Thursday and Friday, July 8, 9 and 10, 1942. The meeting was called to order at 8:00 A. M., Wednesday, July 8, by the president, Dr. W. E. Long. The Secretary stated that each of the following county societies was entitled to the following number of delegates:

Chouteau County Medical Society—1 delegate.
Cascade County Medical Society—5 delegates.
Gallatin County Medical Society—2 delegates.
Hill County Medical Society—1 delegate.
Fergus County Medical Society—2 delegates.
Flathead County Medical Society—2 delegates.
Lake County Medical Society—1 delegate.
Mount Powell Medical Society—2 delegates.
Southeastern Montana Medical Society—3 delegates.
Northeastern Montana Medical Society—2 delegates.
Park-Sweetgrass Medical Society—1 delegate.
Northcentral Montana Medical Society—2 delegates.
Musselshell County Medical Society—1 delegate.
Lewis & Clark Medical Society—2 delegates.
Western Montana Medical Society—5 delegates.
Yellowstone Valley Medical Society—7 delegates.
Silver Bow Medical Society—5 delegates.

A roll call of delegates showed there to be present the following delegates:

Chouteau County Medical Society—Dr. D. J. Cooper.
Cascade County Medical Society—Drs. R. B. Durnin, P. E. Logan, C. F. Little, E. D. Hitchcock, Robert McGregor.
Gallatin County Medical Society—Drs. A. D. Brewer, R. E. Seitz.
Hill County Medical Society—Dr. G. A. Jestrab.
Fergus County Medical Society—Drs. F. F. Attix, J. R. Soltero.
Flathead County Medical Society—Drs. T. B. Moore, F. B. Ross.
Lake County Medical Society—No one.
Mounty Powell Medical Society—Drs. F. L. Unmack, T. J. Kargacin.
Southeastern Montana Medical Society—Drs. J. H. Garberson, B. C. Farrand, M. A. Shillington.
Northeastern Montana Medical Society—Dr. R. E. Ryde.
Park-Sweetgrass Medical Society—Dr. P. L. Greene.
Madison County Medical Society—Dr. L. R. Packard.
Northcentral Montana Medical Society—No one.
Musselshell County Medical Society—Dr. G. A. Lewis.
Lewis and Clark County Medical Society—Drs. S. A. Cooney, O. G. Klein. (Dr. Edyth Hershey, alternate).
Western Montana Medical Society—Drs. A. T. Haas,

A. R. Foss, R. D. Weber, J. M. Nelson, M. B. Hesdorffer.

Yellowstone Valley Medical Society—Drs. L. W. Allard, T. R. Vye, D. E. Hodges, G. J. McHeffey, H. T. Caraway.

Silver Bow County Medical Society—Drs. A. J. Karsted, V. O. Ungherini, R. F. Peterson, F. A. Carmichael, J. C. Shields.

A majority of the delegates being present, the House of Delegates proceeded with the business of the Association. It was moved, seconded, and unanimously carried that the reading of the minutes be dispensed with since these had been published in the official journal of the Association. The Secretary read his report to the House of Delegates. Said report is incorporated with and constitutes a part of these minutes.

Report of Secretary to the House of Delegates

During the past year, the activities of the Association have been mainly those of a routine nature. There has been a moderate increase in the membership of our Association, and the percentage of the members who have paid their annual dues is now higher than it has been at a corresponding time for the past several years.

The officers of the Association made their regular annual visit to the various societies. This year every society in the state with two exceptions was visited. The doctors from Chouteau county were invited to be present at the meeting of the Cascade County Society, when the officers visited it. As has been mentioned, there was no society in Blaine county to be visited.

A great deal of the time of your officers has been devoted to work with the Montana Procurement and Assignment Committee. This committee, as you know, is not a part of the Montana State Medical Association, but is a department of the Federal Government. Its chairman is appointed by the General Offices of Procurement and Assignment Service in Washington, D. C. He chooses two members of the Association to advise with him.

In order that the provisions of the Industrial Practice Act of Montana be adhered to, it became necessary for your Secretary to communicate with the various insurance companies carrying the industrial accident insurance on the new air base in Great Falls, calling their attention to the fact that in Montana the law guarantees every workman free choice of physicians under the Industrial Practice Act.

At this time, I wish to call attention to the fact that the coming year is a legislative year, and it is extremely important that the best possible Legislative Committee be appointed, and that all members of the Association coöperate with this committee.

Respectfully submitted,
Thos. F. Walker, M.D., Secretary
Montana State Medical Association.

It was regularly moved, duly seconded, and unanimously carried that the report be adopted as read.

The Secretary, Dr. Thomas F. Walker, then read the following report of the Council to the House of Delegates:

The Council of the Montana State Medical Association in regular session at Missoula, Montana, July 7, 1942, recommends to the House of Delegates that the yearly dues of the Montana State Medical Association be increased from $8.00 to $10.00 per year.

Second, that the charter of Blaine County Medical Society be revoked inasmuch as this county society has never had the requisite number of members to be a recognized county medical society.

Third, that the Journal-Lancet continue to be the official journal of the Montana State Medical Association, and that an agreement be entered into with the Journal-Lancet for two hundred or more subscriptions per year each year for five years, at $1.75 per subscription per year.

Fourth, that Mr. Toomey be retained as counsel for the Montana State Medical Association for the calendar year 1943 at a fee of $300.00.

Respectfully submitted,
W. E. Long, M.D., President,
Council, Montana State Medical Association.

The House of Delegates proceeded to ballot upon the various recommendations made by the Council, separately.

It was regularly moved, seconded, and unanimously carried:

First, that the dues of the members of the Montana State Medical Association be $10.00 per year beginning January 1, 1942.

Second, that the charter of Blaine County Medical Society be revoked.

Third, that the Journal-Lancet continue to be the official journal of the Montana State Medical Association, and that the Montana State Medical Association enter into an agreement with the Journal-Lancet to furnish us with two hundred or more subscriptions each year for a five year period at a rate of $1.75 per subscription per year.

Fourth, that Mr. Toomey be retained as counsel for the Montana State Medical Association at a fee of $300.00 for the calendar year 1943.

Dr. Long appointed the following committees: *Necrology*—Drs. T. J. Kargacin, G. A. Carmichael, R. F. Peterson. *Resolutions*—Drs. J. H. Garberson, A. Karsted, F. F. Attix, and asked them to report to the scientific assembly at its last meeting of this session.

Dr. Foss reported for the Auditing Committee that the Secretary's books were found to be in order. It was regularly moved, duly seconded, and unanimously carried that the report of the Auditing Committee be accepted.

The following committees made their reports which are incorporated with and become a part of these minutes:

Child Welfare and Maternal Health

(Dr. Frank McPhail, Chairman)

Approximately 20 years ago Montana had the highest maternal mortality of any state in the birth registration area. It is our pleasure to report that in 1941, the Montana maternal mortality rate will be one of the lowest. In 1941 there were 11,446 live births, and 25 maternal deaths. Three of these deaths have been classified as "deaths associated with pregnancy." There is still, however, a great deal that must be done if we are to give all mothers good medical care. Sepsis or infection, was reported as a cause of death in 8 cases. Hemorrhage was a factor in 7 cases, yet blood transfusion was used in only one of these. There was only one autopsy performed in the 24 deaths.

Maternal death followed some surgical procedure in 10 instances: Cesarean section, 5; hysterectomy (hydatid mole), 1; version and extraction, 1; low forceps, 2; laparotomy (ectopic pregnancy), 1.

Three deaths occurred before delivery, 7 during labor, or in the first 24 hours following delivery, 8 occurred between the first and tenth postpartum day, and 6 deaths were ten or more days following delivery.

Consultation was obtained in 17 cases. This is a marked improvement as compared with 1940. In that year there were consultations in only 8 of the 43 deaths.

There were 16 deaths occurring in pregnancies of more than six months duration. Of these there were 11 live births, 3 stillbirths, 3 births not registered. This raises the question that some doctors fail to register all births. By law, all live births and stillbirths of over six months gestation must be registered.

THE PREMATURE PROGRAM

A study of the infant mortality problem reveals that over 60 per cent of the infant deaths occur in the neonatal period. To June 1, 1942, 54 per cent of all neonatal deaths in 1942 are attributed to prematurity. It has been effectively demonstrated that this death rate can be materially reduced by intensive efforts directed toward better understanding and improved facilities for the care of the premature baby.

Since care of the premature baby is essentially a nursing problem, the State Board of Health through the Maternal and Child Health Division provided postgraduate training at the Premature Center of Michael Reese Hospital and Chicago Maternity Center for one of the public health nurses, Miss Helen Murphy. The services of this nurse are made available to hospitals for instruction of nursing staff and actual demonstration of care of premature babies. This service has been given to twenty hospitals in the state since January, 1942.

On request of attending physicians the services of this nurse are available for demonstration of care at the time a premature baby is born. This makes it possible to set up routines and supervise technics of nurses who have not had special training. Eighth requests of this type have been answered. Physicians in these areas have indicated much interest in this service and have appreciated the high quality of service rendered by the nurse assigned to this program.

While specialized nursing care of the premature baby is the keystone upon which the premature program must be built, adequate facilities for care must be provided. To this end twenty-five incubators for hospital use have been built through the State Board of Health and sold to hospitals at less than cost. This model was adapted from the incubator built by the North Dakota Maternal and Child Health Committee following suggestions made by Dr. Gillespie, chairman of the Subcommittee on Premature Care, and Mr. Herbert Walworth of the Industrial Hygiene Division of the State Board of Health, who devised the plan for ventilation and efficient use of oxygen, and checked the temperature and humidity control devices.

The distribution of the incubators throughout the state is widespread so that facilities are now available in the majority of the hospitals. The use of the incubator has been demonstrated by Miss Murphy when placed in each hospital. One hospital has already reorganized its nursery service, and equipped each bassinet with individual supplies.

Plans are now being made to establish a premature center in Great Falls, with a qualified public health nurse trained in premature nursing technics. The services of this nurse will be made available through the city-county health unit to the local hospitals, one of which has equipped a premature unit. It will be possible for nurses from other hospitals to receive short periods of intensive training in this center.

While prematurity is frequently given as the cause of death, studies of autopsies have shown that preventable causes such as infection, birth injuries, hemorrhage of the newborn, inadequate nursing care, and improper feeding are the underlying factors causing death as the mortality of babies over 1500 grams can be greatly reduced where these factors have been recognized and measures taken for their control.

PRENATAL LETTERS

There has been an increased demand for the revised series of prenatal letters issued by the Montana State Board of Health. These new letters were first inaugurated in 1941, and contain exhaustive information for pregnant women, written in simple lay terms.

These letters are sent to patients on the request of the attending physician or public health nurse. They are forwarded directly to the patient, one letter being sent each month. Doctors have found that a great deal of time can be saved when their patients receive these letters that would ordinarily be spent in explaining the many different problems confronting the pregnant woman. 1,914 requests for prenatal letters were received during the period from January, 1941, to December, 1941. 1,279 of these were from physicians, 483 were from public health nurses and 152 were from other sources. These requests for the newer letters represent a marked increase over the demand in previous years.

RULES AND REGULATIONS FOR HOSPITALS

In 1941, the Montana State Legislature passed a bill requiring all maternity hospitals and homes to be licensed. This bill was sponsored by the Montana Hospital Association and the Montana Medical Association. The bill was rather general and included no specific recommendations for actual rules and regulations, but gave authority for writing and enforcing such rules and regulations to the State Board of Health. Provision was also made in the bill for inspection of the various institutions by the State Board of Health before licensing.

The rules and regulations are now completed, and it remains only to have them approved by the Committee on Maternal and Child Health, and Hospital Committee before the actual licensing begins. Considerable difficulty was encountered in compiling these rules owing to the wide difference between the various hospitals. Special attention is given to the regulations for maternity homes.

Classification of the maternity hospitals is based on quality of care rather than volume of deliveries. The material covered resolves itself into two distinct headings; namely, requirements and recommendations. The requirements are minimal and fundamental for the management of every maternity hospital. The recommendations, however, are quite exhaustive and give detailed methods for technics and procedures used in the care of the mothers and newborn infants.

In compiling the rules and regulations a great many other state manuals were referred to and many suggestions and ideas were thus obtained.

POSTGRADUATE SESSIONS

Three postgraduate sessions were held during the fiscal year ending July 1, 1942.

There were three different postgraduate lectures. Two men lectured on obstetrics and one on pediatrics. Twelve cities were visited and a total of 159 men attended (this does not include duplicate attendances). The areas covered were: Southeast area—Billings, Lewistown, Miles City, Great Falls; Northwest area—Kalispell, Polson, Missoula, Hamilton; Southwest area: Helena, Anaconda, Butte, Bozeman.

Men from 27 towns other than those listed above, and one other state (Wyoming), attended the meetings.

Dr. Norman Kretzschmar of the University of Michigan was the lecturer for the Southeast area and was well received. Sixty-three men attended his meetings.

The second lecturer, Dr. Willard B. Rew, from Yakima, Washington, talked on pediatrics. There was almost 100 per cent attendance at his meetings, excepting Missoula, where the turn-out was extremely poor. A total of 39 doctors attended the meetings.

The third lecturer was Dr. Russell Moe, from Duluth, Minnesota, who talked on obstetrics. His meetings were well attended and the Butte meeting was exceptionally good in that more than half the doctors in Butte were present. A total of 58 doctors attended the meetings in the Southwest area.

The maternal mortality rate in Montana for 1941 was very low. Preliminary figures for 1942 indicate that this low rate will not be maintained, as there have been almost as many deaths so far this year as in the entire year of 1941. Your Committee wishes to make the following recommendations:

1. As maternal death followed some surgical procedure in over 35 per cent of the deaths in 1941, major surgical procedures should be undertaken only after adequate consultation. In 1941, one-sixth of all of the maternal deaths followed cesarean section.
2. Sepsis has been greatly reduced in the last 20 years, yet one-third of the 1941 deaths was a result of infection. Avoidance of operative interference will help reduce the incidence of infection.
3. Hemorrhage was a factor in almost one-third of the maternal deaths. Better facilities for blood transfusion are necessary and blood transfusion must be used earlier and more frequently, if we are to prevent these deaths.

The infant mortality rate in 1942 is slightly higher to date than in 1941. Better care of babies born prematurely will prevent a large number of deaths in the first week of life. Your Committee recommends the continued use of the services of Miss Helen Murphy in training the nursing staff of the various hospitals so that better technic in the nursery may be followed.

Your Committee also recommends that autopsy studies be made more frequently. It has been demonstrated that infection, birth injury, hemorrhage of the newborn, inadequate nursing care and improper feeding are the underlying factors causing death rather than prematurity. Many of the deaths in the group of babies born prematurely can be prevented, if these factors are properly recognized and measures taken for their control.

The reduction in maternal and infant mortality since the Social Security Act went into effect is striking. Your Committee wishes to express their thanks to the members of the Montana State Board of Health, to the personnel of the Children's Bureau and to the members of the Montana Medical Association for their continued efforts in the interest of better health for mothers and babies.

We must continue to extend and improve medical and hospital facilities in this state. We have shown that it is possible to have less than 20 maternal deaths per 10,000 live births. We must maintain this low rate and continue to lower our infant death rate. This can be done only by assuring every maternity patient competent medical and nursing care throughout the entire pregnancy, and when necessary, care in a hospital with complete maternity service.

Respectfully submitted,
Frank L. McPhail, M.D., Chairman
Child Welfare and Maternal Health.

Cancer Committee

Dr. J. H. Garberson, Chairman

The Cancer Committee of the Montana State Medical Association, and the Women's Field Army have coöperated in putting on the cancer program in Montana this year. The program has been most effectively carried out, thanks to the efficient leadership of Mrs. H. W. Peterson of Billings. A questionnaire is being sent out regarding the advisability of having trained "tumor men" in the Army during the present war. Your Committee feels that this is an effective and necessary public service, and that the Montana State Medical Association should continue to coöperate in the work.

Historical Committee

Dr. E. D. Hitchcock, Chairman

Your Committee on The History of Medical Papers wishes to make the following report: The material as prepared for publication of The Pioneer Physician is in fairly good form. The American Medical Association sometime back offered to edit and arrange for publication, but your Committee feels, owing to the war conditions, the number of men going into the service and the shortage of paper and personnel, that it would probably be very difficult at the present time to get the history of the Pioneer Physicians of the State out in an acceptable manner; the distribution of the volume would be rather difficult owing to the loss of a great number of physicians from the state who would normally be interested. The cost of publishing the same would be raised materially owing to war conditions, and we respectfully recommend that the material which has been gathered during the past few years and compiled be placed in a safe place, and when the war is over that publication be considered.

E. D. Hitchcock, M.D., Chairman.
Historical Committee.

Medical Publications Committee

Dr. A. R. Foss, Chairman

The contract with the Journal-Lancet as your official Journal, expires this year, and it is the opinion of your committee that the contract be renewed for a period of five years at $1.75 per subscription for five years, for not less than 200 subscription to be allocated by our State Secretary.

A. R. Foss, M.D., Chairman
Medical Publications Committee

Industrial Hygiene Committee

Dr. A. T. Haas, Chairman

About two months ago, your President, Dr. Long, wrote me a letter appointing me Chairman of the Industrial Hygiene Committee of the Montana Medical Association. Dr. Sussex of Havre has been the chairman of this committee for several years, but I have not been able to obtain from his office any report or records of the work he has done. I know that he has been active inasmuch as he held at least one meeting.

About one month ago, Dr. Orlen J. Johnson, who is the American Medical Association representative of the National Council of Industrial Health, visited me. Dr. Johnson suggested a program which is being carried out in several states. It consists of a selected number of outside doctors to give papers on Industrial Health. These papers would also have such subjects as skin diseases and back injuries, etc., which subjects are closely allied to Industrial Health, and are of interest to the average physician. It probably would be advisable to have meetings in about four of the larger Montana cities. Billings, Great Falls, Butte, and Missoula are being considered. These talks and programs would be sponsored jointly by the Council of Industrial Health of the American Medical Association and by the Montana State Board of Health. My understanding is that the cost of obtaining the men for these lectures will be evenly divided between the Montana State Board of Health and the American Medical Association Industrial Health Council. I shall talk with Dr. Cogswell regarding this, but at the present time no definite plans have been formulated. It seems to me that if it is at all possible to obtain satisfactory speakers and interesting subjects, it would be well worth our while to go ahead with these plans providing the war effort will be no hindrance to such meetings.

I am in receipt of the annual report of the Division of Industrial Hygiene of the Montana State Board of Health made by H. T. Walworth, Acting Director. This division is now in its second year and apparently the ground work for a thorough and efficient service to industry is being laid. The new quarters for this division of Industrial Health have been prepared in the Capitol Building in Helena. An office and laboratory are available. Considerable engineer field studies are being undertaken. Detailed studies were made in 39 plants employing 2,936 workers during the year. Reports of findings of these studies with recommendations were made to all these plants. Follow-up studies have revealed that a large percentage of these recommendations has been complied with. Construction plans for seven plans were studied and recommendations were made. A total of 1,094 field and laboratory determinations were made. Disability due to sickness in the plants has been made.

The educational program of this division consisted of the following activities: Lectures before interested groups; radio talks; distribution of preliminary survey reports; preparation of bulletins on respirators, and distribution of worker's health bulletins.

A. T. Haas, M.D., Chairman
Industrial Hygiene Committee.

The Nominating Committee

Dr. F. F. Attix, Chairman

In conformity with the resolution adopted by the State Medical Association of Montana, the president was required to appoint a nominating committee to select a list of names for the respective officers to be presented to the House of Delegates. We also recognize that additional names may be nominated from the floor. We respectfully submit the following list of names for the various officers of the State Medical Association of Montana:

President—Dr. J. P. Ritchey, Missoula; Dr. J. C. Shields, Butte.

Vice-President—Dr. A. C. Knight, Phillipsburg; Dr. R. E. Seitz, Bozeman.

Secretary-Treasurer—Dr. T. F. Walker, Great Falls; Dr. S. A. Cooney, Helena.

Councillors: Dr. L. W. Allard, Billings; Dr. Chas. Houtz, Havre; Dr. A. R. Foss, Missoula; Dr. E. A. Welden, Lewistown; Dr. J. H. Garberson, Miles City; Dr. J. H. Irwin, Great Falls.

A list of five names submitted for the consideration of the Governor of Montana for any vacancies occurring on the State Board of Health: Dr. R. B. Morledge, Billings; Dr. David Berg, Helena; Dr. George Jestrab, Havre; Dr. C. L. Bourdeau, Missoula; Dr. Harold Schwartz, Butte.

Respectfully submitted,
F. F. ATTIX, M.D., Chairman
Nominating Committee.

Each of these committee reports after a brief discussion was unanimously accepted.

After motion duly made and seconded, the President declared the meeting adjourned to 8:00 A. M., Thursday morning.

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The adjourned meeting of the Sixty-fourth Session of the Montana State Medical Association was called to order at 8:45 A. M., July 9, 1942, by Dr. W. E. Long, President. The roll call showed thirty-five delegates to be present. This being more than the required quorum, the House proceeded to business.

The first order of business was reports of the following committees:

Dentists, Pharmacists, and Nurses

Dr. A. R. Foss, Chairman

The Southeastern Medical Society informed your Secretary early in the year that the State Board of Nurses Examiners were adopting a new rule not to license nurses who graduate from training schools having less than an average of one hundred patients. There was considerable controversy on this proposed ruling and the matter was referred to this Committee.

On investigation in Helena, it was found that no such ruling was ever considered by the State Board of Nurses Examiners. Instead it was learned that the State Board of Health had proposed that supervisors of Public Health Nursing be graduates of, or have affiliation with hospitals of one hundred or more patients. There being no objection to this proposal, your Committee was satisfied to report its findings to you and not enter into any further debate.

On April 7, 1942, the State Board of Health sent a circular letter to all doctors practicing in Montana, clarifying the new Federal Food, Drug, and Cosmetic Act. Enclosed was a list of drugs designated as "habit-forming." The law provides that a pharmacist must list on the label of a drug the name and proportion or quantity of habit forming drugs present, and in juxtaposition therewith the statement: "Warning—May be habit-forming." If a physician wishes to avoid this complicated labeling and alarming statement on his prescriptions, they should be marked as "non-refillable" or "N.R." Pharmacists who refill without specific written authorization, or those who sell habit-forming and dangerous drugs without adequate labeling and warning statements, place themselves liable to prosecution under State and Federal Drug Laws.

A. R. FOSS, M.D., Chairman
Dentists, Pharmacists and Nurses Committee.

Postgraduate Committee

Dr. F. R. Schemm, Chairman

No report.

Fracture Committee

Dr. R. B. Richardson, Chairman

No report.

Women's Auxiliary Committee

Dr. J. I. Wernham, Chairman

No report.

Orthopedic Committee

Dr. L. W. Allard, Chairman

No report.

Legal Affairs Committee

Dr. P. E. Kane, Chairman

In the absence of Dr. Kane, Dr. McGregor gave a verbal report, stating that during the year there was only one damage suit which threatened to be carried into court. After the Committee had talked with the doctors who were to appear in this case, a settlement was reached out of court. The suit was for $30,000 but settlement was secured for $200, paid by the insurance company to the plaintiff. Dr. McGregor stated that he would advise fighting every case rather than pay damages even though the amount concerned was very small.

Each of these reports was, upon motion duly made, seconded, and unanimously carried, adopted.

Medical Economics Committee

Dr. J. C. Shields, Chairman, made a partial report, stating that they would bring in the balance of their report the next morning after meeting with a representative of the Farm Security Administration. As its partial report, the Committee introduced the following resolution:

> "That the matter of new fee schedule changes affecting the medical profession of Montana should in the future be referred to the Medical Economics Committee."

After discussion this motion was, upon being duly seconded, unanimously carried.

Dr. Unmack of the Mount Powell County Medical Society brought up the question of changes in the fee schedule which had recently been made by the Industrial Accident Board. Dr. Cooney of Lewis and Clark county stated that at a meeting of the committee appointed by Dr. Long to represent the Medical Association of Montana and a committee representing the Industrial Accident Board, certain changes were made in the fee schedule of the Industrial Accident Board. The fees for X-rays of hands, feet, legs and arms were reduced, while certain other fees were increased. Dr. Cooney said that in his opinion none of these fees should have been reduced, and that had the representatives of the Medical Association insisted they not be reduced, that such reduction would not have taken place.

After a brief discussion, it was regularly moved, seconded, and carried by a standing vote of 21 to 14 that the Medical Association ask for a reconsideration of the lowered fees, and that they be restored to their former level.

The next order of business was the election of officers. No names in addition to those having been submitted by the Nominating Committee having been submitted, the House of Delegates balloted on names submitted by the Nominating Committee after the House of Delegates had consented to the withdrawal by Dr. Shields of his name as a candidate for president.

The ballot was as follows:

Vice-President—	
Dr. A. C. Knight	19
Dr. R. E. Seitz	14
Secretary-Treasurer—	
Dr. T. F. Walker	23
Dr. S. A. Cooney	12

The following were unanimously elected Councillors:

Dr. L. W. Allard, District No. 4—1945.
Dr. Chas. Houtz, District No. 2—1943.
Dr. A. R. Foss, District No. 12—1944.
Dr. E. A. Welden, District No. 6—1945.
Dr. J. H. Garberson, District No. 3—1945.
Dr. J. H. Irwin, District No. 8—1945.

The following names submitted by the Nominating Committee to be submitted to the Governor for consideration in filling any vacancies occurring on the State Board of Health during the year 1943 were the unanimous choice of the Association:

Dr. R. V. Morledge, Billings.
Dr. David Berg, Helena.
Dr. George Jestrab, Havre.
Dr. C. L. Bourdeau, Missoula.
Dr. Harold Schwartz, Butte.

After it had been moved, seconded, and unanimously carried that the Secretary be instructed to cast a unanimous ballot for Dr. J. P. Ritchey as President-elect, Dr. Long declared the following officers of the Montana State Medical Association duly elected:

Dr. J. P. Ritchey, Missoula, President-elect.
Dr. A. C. Knight, Phillipsburg, Vice-President.
Dr. T. F. Walker, Great Falls, Secretary-Treasurer.
Councillors—Dr. L. W. Allard, Billings; Dr. Chas. Houtz, Havre; Dr. A. R. Foss, Missoula; Dr. E. A. Welden; Dr. J. H. Garberson; Dr. J. H. Irwin.

Likewise, Dr. Long declared the choice of the Association for names to be submitted to the Governor from which he might fill any vacancies that occurred on the State Board of Health during the year 1943 to be Dr. R. V. Morledge of Billings, Dr. David Berg of Helena, Dr. George Jestrab of Havre, Dr. C. L. Bourdeau of Missoula, and Dr. Harold Schwartz of Butte.

After the election, the President stated that a special meeting of the House of Delegates would be held at 5:00 P. M. Wednesday, July 9, for the purpose of taking up discussion of Procurement and Assignment Services in Montana. Dr. R. Kroeze of Butte had previously brought up the subject, but the chair had ruled that this being new business, it could not be taken up in a regular meeting until previous business had been finished. However, Dr. Long stated that the subject was of sufficient importance that he believed a special session in which this would be the only order of business should be held.

The meeting adjourned at 10:00 A. M.

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The adjourned meeting of the House of Delegates of the Sixty-fourth Annual Session of the Montana State Medical Association convened at 9:00 A. M., Friday, July 10.

Dr. Attix presented the following report of the Medical Economics Committee:

Medical Economics Committee

Dr. J. C. Shields, Chairman

Mr. President: At a meeting of the Medical Economics Committee July 9, 1942, it was moved by Dr. Garberson (and seconded) that if a client family uses $100.00 worth of services (calculated on the basis of the fee bill of the State Association) in any one year, renewal must be made for two more years; if $150.00 for three more years. To this end a promissory note to that effect shall be included in the original application of the client. Carried and adopted by the Committee on Medical Economics.

Mr. Toomey will be asked to prepare in legal form the above resolution to be inserted in the standard contract.

After considerable discussion upon motion regularly made, duly seconded, it was the unanimous decision of the Association that this report should be adopted.

Report of Public Relations Committee

Dr. Leonard Brewer, Chairman

Mr. President and Members of the House of Delegates: Your Public Relations Committee for the year 1941-1942 held one meeting on November 30, 1941, in Helena. This meeting was attended by Drs. Walker, Shillington and Brewer. After considerable discussion, it was decided that the Committee should remain inactive for the year.

This decision was reached not because the Committee feels that the public relations work of the State Association is unimportant. On the contrary, it was the unanimous opinion that a proper program of public relations is one of the main junctions which the State Association can serve. However, as a result of going over material as supplied by the Public Relations Bureau of the New York Medical Association, the American Medical Association, and other material, the Committee feels emphatically that such a program should not be undertaken except after considerable discussion and approval by the House of Delegates, and particularly with the knowledge of the profession as a whole within the state, that to do the job properly requires more expenditure of time and funds than the present state organization seems able to support along with its other activities.

Within a week or so after this meeting the beginning of war made it clear that whatever the reasons affecting the Committee's choice in the first place, the decision would need to be adhered to, probably for the duration.

Considering the importance of public relations programs for the medical profession as a whole, it is the recommendation of this Committee that a standing committee on public relations be appointed for the duration of the war, with the objective of developing and promulgating within the profession, at annual sessions, and otherwise, a postwar program of public relations, applicable to the conditions of practice and reconstruction within the state.

Some of the problems which will need consideration will be those of reëstablishment in practice of doctors discharged from the Service, the care of veterans, the medical care of shifting population within the state, the future role of F.S.A. and other similar health prepayment systems. Much of the future form of medical practice may depend on what consideration the profession has given to these problems in advance of the actual need. The success of our handling of these problems may depend in large part on our vision in attacking them and in the diplomacy with which the public relations aspect of each is managed.

Report of Committee on Exhibits

Dr. M. A. Shillington, Chairman

The Committee on Exhibits has been active since its appointment last fall. We immediately began corresponding with firms which are purveyors to the medical profession, altogether fifty-two firms were contacted. Of this group seventeen agreed to take space for exhibits at the meeting to be held in Missoula July 8, 9 and 10. The firms exhibiting are as follows:

Shadel Sanitarium.
Morning Milk Company.
Eli Lilly & Company.
General Electric X-Ray Corp.
Sandoz Chemical Works.
Phillip Morris & Co., Ltd.
E. R. Squibb & Sons.
John Wyeth & Bro.
Riggs Optical Co.
The Lederle Laboratories.
The Borden Company.
The Cutter Laboratories.
Sego Milk Products Co.
Mead Johnson & Co.
Physicians & Hospitals Supply Co.
American Optical Company.
Upjohn Co.

For this space they have paid a total of $725.00.

As an added feature of the exhibits this year a small pamphlet has been prepared, known as the Technical Exhibit for 1942. Copy of this pamphlet is attached hereto and made part of this report.

At the close of this meeting a letter of appreciation will be sent to each of the firms participating.

After considerable discussion of the agreement between the Montana State Medical Association and the F.S.A., the next order of business was declared to be the selection of a place of meeting for the Sixty-fifth annual session of the Montana State Medical Association in 1943.

Dr. H. T. Caraway of Billings extended an invitation from the Yellowstone Valley Medical Society to hold the meeting in Billings. Upon motion regularly made, seconded, and unanimously carried, it was decided to hold the Sixty-fifth annual session of the Montana State Medical Association in Billings, Montana, at a time to be determined by the Executive Committee.

There being no further business to come before the House of Delegates, the President declared the meeting adjourned.

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Minutes of the special meeting of the House of Delegates held at the Florence Hotel in Missoula, Montana, the 9th day of July at 5:00 P. M.

President W. E. Long stated that the purpose of this meeting was to discuss the Procurement and Assignment Committee in Montana. Dr. R. Kroeze of Butte, Dr. Sievers, Jr., of Butte, Dr. H. T. Caraway, chairman of the Montana Procurement and Assignment Committee, Dr. T. F. Walker, a member of said committee, and several others discussed at some length the actions of the Procurement and Assignment Committee in carrying out their duties in Montana as well as the principles upon which the National Procurement and Assignment Services were established and conducted.

The members of the Procurement and Assignment Committee explained how the Committee attempted to carry out its duties in Montana. A number of other members than those mentioned entered briefly into the discussion. After the matter had been freely discussed, Dr. R. B. Durnin of the Cascade County Medical Society moved that the House of Delegates go on record as endorsing the work done by the Procurement and Assignment Committee in Montana. The motion was seconded and carried by a majority vote.

There being no further business to come before the special meeting, upon motion regularly made, duly seconded, and unanimously carried, the meeting adjourned.

SCIENTIFIC SESSION

The Sixty-fourth Annual Scientific Session of the Montana State Medical Association was called to order by President W. E. Long at the Florence Hotel in Missoula, Montana, at 10 A. M., Wednesday, July 8.

Dr. W. E. Long introduced President A. R. Foss of the Western Montana Medical Association who welcomed the members of the Montana State Medical Association to Missoula.

Dr. Foss' address of welcome was followed by the installation of Dr. E. D. Hitchcock as President of the Association. Dr. Hitchcock then gave the presidential address which is incorporated as a part of these minutes.

PRESIDENTIAL ADDRESS

One year ago you did me the honor of elevating me to the high office of President-Elect of the Montana State Medical Association. I am deeply grateful for this evidence of your high regard and confidence. You have established a new order in that the President on taking office must give his address as President-Elect. I have had the opportunity of visiting most of the county societies, accompanying President Long and your Secretary, Dr. Thomas Walker. This was a splendid experience, the fellowship and the new friends made, I believe, will unite the State Medical Association in a closer bond of interests. We are living in a large state with long distances to travel, but this gathering here today is evidence of the deep interest in the science of medicine held by you. This gathering represents organized medicine in Montana, and as such we have a great responsibility to the people of this state. As individuals we are engaged in the practice of medicine and its various branches. To exchange experiences is often of great benefit not only to ourselves but to the people we serve. Our profession is a unique one, in that we are constantly endeavoring to prevent disease, to raise the general public health and to find new ways to lessen the time period of illness. A generation ago medical practice was rather simple and a physician's practice was limited in his ability to cover it in a horse and buggy or on horseback. His clientele was more fixed and he lived out his life among the small group that he served. His medical resources were small as compared to the expensive and complicated equipment of today. Medical economics had not been heard of then, and he adjusted his fees in accordance with the patient's ability to pay. The whole picture has changed now. In recent years the whole world has gone through a process of socialization in which great masses of people are demanding free medical care. Economics generally have changed and large groups of people have found themselves with lessened incomes. We have solved this latter problem in part by the formation of Group Health Insurance. Some of the groups so formed have proven quite satisfactory both to the physician and to the patients. Others have been disappointing and are being given up.

In some instances the people composing the Health Insurance Groups were in part those who could well afford to pay for medical care. These people mostly dropped the insurance when their disabilities were taken care of. With the stepping up of industry generally due to the war, bountiful crops and increased earnings generally, this problem should solve itself. Socialization of medicine has been held up at least temporarily by the great World War which is upon us. On the conclusion of peace we will again be faced with political domination and an attempt on the part of the administration to give to the people some type of free medical care.

We have many bureaus who even during this war period are fighting for power. In the postwar period this desire for a place in the sun will be accentuated and the free practice of medicine as we know it now will probably be shoved aside. Should this war last many years the large group of medical men in the Service who have never known civil medical practice will doubtless be willing to enter government controlled medical practice. Of this I am sure—we must bend every effort to win this great world struggle. The people of the United States will find that as always the physicians will do their part.

During recent months the physicians of this country have been accused by men in authority of being unpatriotic. They have cited the need for medical officers, but I submit to you that the fault does not lie within the medical group but rather in government bureaus bound up with red tape. There is a grave responsibility placed upon the physicians who must remain at home. We must safeguard the health of our people and at the same time protect, as much as possible, the right of free medical practice. We want the doctors of this state to return following the war and when they view our great mountains, rivers, and prairies, to feel that this is home.

E. D. Hitchcock, M.D.

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The official program follows:

WEDNESDAY, JULY 8

8 to 10 A. M.—Meeting of House of Delegates. Exhibits open to inspection.

10 A. M.—Call to order—President W. E. Long. Address of Welcome—President A. R. Foss, Western Montana Medical Society. Installation of Dr. E. D. Hitchcock as President of the Association. Presidential Address—Dr. E. D. Hitchcock.

11 A. M.—Experiments with Radioactive Substance—Daniel Q. Posin, University of Montana.

12:15 P. M.—Luncheon Meetings: Presidents of County Societies; Secretaries of County Societies; Alumni Groups.

2 P. M.—Headache—Dr. L. R. Boies, University of Minnesota.

3 P. M.—Intermission to visit exhibits.

3:20 P. M.—Pathology of Silicosis and Silico-Tuberculosis—Dr. G. J. McHeffey, Billings, Montana.

6:30 P. M.—Picnic Luncheon, Movies, Dancing—Missoula Country Club.

THURSDAY, JULY 9

8 to 10 A. M.—Meeting of House of Delegates. Exhibits open to inspection.

10 A. M.—Postoperative Atelectasis and Bronchopneumonia—Dr. Cameron Haight.

11 A. M.—Fundamental and Clinical Considerations in Intestinal Obstruction—Dr. H. K. Ransom, University of Michigan.

12:15—Panel Discussions: Room A—Dr. Cameron Haight—Surgical Diseases of the Chest; Room B—Dr. H. K. Ransom—Management of Perforated Appendix; Room C—Dr. N. F. Miller—Pelvic Disease in the Female.

2 P. M.—Film: The Human Cervix in Health and Disease—Dr. N. F. Miller, University of Michigan.

3 P. M.—Intermission to visit exhibits.

3:20 P. M.—Coronary Thrombosis: Discussion of some of the errors in diagnosis—Dr. Cyrus C. Sturgis, University of Michigan.

4:20 P. M.—Fortification and Enrichment of Foods, and Nutritional Significance of the Vitamins—Dr. Howard B. Lewis, University of Michigan.

6:30 P. M.—Banquet. Dr. Cyrus C. Sturgis, principal speaker.

FRIDAY, JULY 10

8 to 10 A. M.—Meeting of House of Delegates. Exhibits open to inspection.

10 A. M.—Recent Developments in Treatment of Surgical Diseases of the Chest—Dr. Cameron Haight.

11 A. M.—Recent Studies in Metabolism of Proteins Which Are of Clinical Significance—Dr. H. B. Lewis.

12:15 P. M.—Luncheon. Panel Discussions: Room A—Diseases of the Blood—Dr. Cyrus C. Sturgis; Room B—Vitamins—Dr. H. B. Lewis.

2 P. M.—Surgery of the Ovary—Dr. N. F. Miller.

3 P. M.—Reports by Representatives of: Woman's Auxiliary to the Montana State Medical Society; Women's Field Army for the Control of Cancer, Montana; State Tuberculosis Association.

3:30 P. M.—Menace and Treatment of Obesity—Dr. C. C. Sturgis.

4:30 P. M.—The Diagnosis and Management of Disease of the Biliary Tract—Dr. H. K. Ransom.

Motion picture films shown daily in the general meeting room from 9 to 10 A. M.

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Mrs. Peterson, Commander of the Montana Women's Field Army, gave the following report of the activities of the Field Army in Montana for the preceding year:

Montana Women's Field Army

The Montana Division of the Women's Field Army now has a top rating with the American Society for the Control of Cancer. Our state is considered well organized and our program is considered sound and successful. In March, Dr. Donald Trueblood of Seattle and I represented the Northwest at the Annual Board of Directors Meeting in New York. Out of this meeting has come plans for an intensive training program for the officers of the Field Army and a war service type of program to supplement our lay education program. National Officers will meet at Bar Harbor, Maine, and at New York Memorial Hospital, New York City, September 14-26. During this two-week period the course of study will deal with the relation of general biology to the cancer problem and the relation of the cancer problem to other problems of public health. Officers completing the course will be expected to promote and direct one or more state or regional schools for the purpose of extending the training to state and district officers. This is briefly what the Montana Division will endeavor to add to its regular program in the year ahead. Montana has just finished a successful educational crusade and enlistment campaign. We have increased our membership 15 per cent this past year. We now have over 6,000 members—almost as many are men as women. We are one of four states to reach or exceed our state quota of one membership dollar for each 100 of population.

Approximately 700 Montana men and women participated actively in our work during the past year. All but one county had some form of activity.

Our Lay education program was considerably expanded, especially in connection with the schools. State, county, and local school authorities welcomed our program in practically every community where our local leadership was at all adequate. Based on subject matter especially prepared for high school students, successful posters and essay contests were sponsored in many communities. Twice as much literature was distributed as previously. The movies (four in number) were shown almost constantly from March 1 to June 1. They were shown by the theatres as a part of their regular program and in the schools as classroom work and at assemblies.

We have made real progress toward cancer control. As State Commander, I know the changed attitude of the average Montana man and woman toward Cancer as a problem and as a threat to their own personal safety.

I know, too, that many Montana physicians who five years ago thought it unwise to dwell on the seriousness of this disease; who were fearful that detailed information about the signs and symptoms of cancer would create cancer phobia with its attendant mental distress, now concede that factual information about cancer and dramatization of its dangers, has strengthened the fiber of countless men and women consulting them professionally.

The W.F.A. in Montana will carry on. Our women will do war work and cancer control work, not war work instead of cancer control. This is a pledge to the Montana Medical Association and to the people of Montana.

Mrs. David T. Berg, President of the Women's Auxiliary, reported on the activities of the Auxiliary as follows:

Women's Auxiliary

At this, the end of the first year of organized activity, the Montana Auxiliary has three active county groups. They are: Cascade county, 29 members; Lewis and Clark, 16 members, and Western Montana, 29 members. Total, 74 members.

Our purpose is not to dictate, but to try to help your profession, to act only upon advice of our county and state medical groups. As doctors' wives, we try individually to be your helpers. Surely we can be still more helpful as an organized group—we want you to want us, to be interested in us.

When you go home and recount to your wife the happenings of the convention, please don't forget to mention the Woman's Auxiliary if you have been impressed by its activity.

The Necrology Committee of which Dr. T. J. Kargacin is Chairman, submitted the following report, which upon motion regularly made, duly seconded, and unanimously carried, was adopted:

Necrology Committee

During the fiscal year, June 1941 to June 1942, the Montana Medical Association has lost by death, five of its members:

C. M. RUSSEL, M.D., Billings.
J. F. S. MARSHALL, M.D., Missoula.
J. D. BARRETT, M.D., Billings.
J. C. DUNN, M.D., Lewistown.
M. T. VORNHOLT, M.D., Roundup.

This Committee respectfully requests that their names be engraved in the Chapter Eternal of the Minutes of the Montana Medical Association; to record with regret the completion of lives of ministration to human suffering.

The Committee requests the secretary to forward a copy of these resolutions to the respective families.

The Resolutions Committee submitted the following report which upon motion regularly made, duly seconded, was unanimously adopted.

Resolutions Committee

To the members of the Medical Association of Montana, your committeé of resolutions appointed by the members submit the following report:

Whereas the Sixty-fourth Session of the Medical Association of Montana nearing its completion in Missoula today, July 10, 1942, has been a signally successful and well conducted one and since much of the success of said meeting has been due to the untiring efforts of the following individuals and organizations, namely:

The Western Montana Medical Association and its committee on arrangements through their excellent preparation and gracious hospitality. The Press of Missoula by their well considered publicity. The Guest Speakers by their excellent scientific contributions. The Exhibitors, both scientific and commercial, who through their fine displays and splendid spirit of coöperation have done much to add to the meeting. The Hotel Florence for their excellent accommodations. The Missoula Country Club and the City of Missoula by their fine entertainment and hospitality. The Woman's Auxiliary of the Medical Association of Montana and the ladies of Missoula who have provided the wide and splendid entertainment for the ladies and also numerous individuals whose efforts have contributed toward making this a highly successful occasion.

Now, therefore, be it resolved, that the thanks and appreciation of the Medical Association of Montana be extended to all above individuals and organizations who have made this a pleasurable and memorable event and that a copy of the resolution be spread upon the minutes of the organization and presented to the Press of Missoula.

J. H. GARBERSON, M.D., Chairman
Resolutions Committee.

There being no further business to come before the session, President W. E. Long declared the Sixty-fourth Annual Scientific Session of the Montana State Medical Association closed.

Commercial Exhibits

Everyone feels that our commercial exhibits were perhaps the best we have ever had. Likewise, the exhibitors were very much pleased with the number who visited their booths and registered with them. A number of them have already signified their desire to be present at our next meeting.

We are pleased to state that the collections from our exhibitors went a long way toward defraying the expenses of the meeting.

A novel feature was a small pamphlet entitled "The Technical Exhibit" which was prepared by Dr. M. A. Shillington for distribution to the members of the Association. There can be little doubt that the success of the technical exhibit was largely due to the untiring effort of Dr. Shillington. In the above-mentioned pamphlet Dr. Shillington says:

"This pamphlet has a three-fold purpose: first, to acquaint the attending physicians with those agencies which supply them with the more essential supplies for their profession; second, to appraise exhibitors and physicians alike of the aims of the Montana society with regard to technical exhibits; and, third, to emphasize the mutual responsibilities of the exhibitors and of the physicians.

"On behalf of the exhibitors this meeting represents a cash outlay of almost $3,000.00. Equipment, back grounds and products are valued at over $5,000.00. These expenditures are made, not to sell goods directly, but primarily to put their products or their institutional story before a selected audience.

"Physicians should not resent the request of some representatives to register with them. It is a small courtesy, without obligation, and is often interpreted by the representatives' home office as an evidence of the effectiveness of the exhibit."

The following firms exhibited with us:

Morning Milk Co., Salt Lake City, Utah.
Eli Lilly & Co., Indianapolis, Indiana.
General Electric X-Ray Corp., Spokane, Washington.
Sandoz Chemical Works, Inc., San Francisco, California.
Philip Morris & Co., Ltd., New York, New York.
E. R. Squibb & Sons, New York, New York.
John Wyeth & Brothers, Inc., Philadelphia, Pennsylvania.
Lederle Laboratories, New York, New York.
The Borden Company, New York, New York.
Cutter Laboratories, Berkeley, California.
Sego Milk Products Co., Salt Lake City, Utah.
Mead Johnson & Co., Evansville, Indiana.
Physicians & Hospitals Supply Co., Minneapolis, Minnesota.
Riggs Optical Company, Spokane, Washington.
American Optical Company, Portland, Oregon.

Scientific Exhibits

Dr. C. L. Bourdeau of Missoula was in charge of the Scientific Exhibit and deserves no little credit for the fact that our Scientific Exhibit this year showed a healthy growth.

Those who prepared scientific exhibits were:

Montana State Board of Health, Exhibit on Maternal and Child Welfare.
Dr. J. H. James, Murray Hospital Tumor Clinic, "Transparencies illustrating tumors and their treatment."
Western Montana Clinic, "Intestinal drainage by use of the long tube."
Dr. Peterson of Hamilton, Montana—Drawings illustrating peritoneal repair technic.
Dr. M. A. Shillington, Glendive, "Pollen studies in Southeastern Montana."
Dr. J. C. Shields and St. James Hospital Group, "Fractures."
Western Montana Medical Society, "The Iron Lung."
Dr. Dora Walker, Great Falls—Pastel Pictures of Normal and Pathological blood specimens.

Hobby Show

A new feature of the session was the "Hobby Show" which again was largely due to the efforts of Dr. M. A. Shillington.

Dr. E. S. Murphy of Missoula showed a very interesting collection of paintings and sculpture by the Reverend Anthony Ravalli, first physician in Montana, together with his medical library and some of his equipment.

Dr. Lemon of Glendive exhibited a number of oil paintings.

Dr. E. D. Hitchcock of Great Falls showed a series of X-ray pictures of flowers.

A stamp collection showing all issues of stamps commemorating the Olympic Games was entered by Dr. J. C. Powers of Billings.

Dr. Thomas F. Walker of Great Falls exhibited a collection of Montana arrowheads.

Dr. D. T. Berg of Helena had a large and very excellent exhibit of sculptured and painted anatomical models.

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The entertainment program put on by the Western Montana Medical Society was one of the most enjoyable parts of the meeting. No one who saw the beautiful colored lantern slides presented by the Forestry Department at the Missoula Country Club will ever forget the beauty and artistry of these colored photographs, nor the very interesting talk that accompanied them.

The banquet, at which Dr. Cyrus Sturgis delivered the principal address and at which Dr. William Long gave comments covering the activities of the Association during his year as president, was very well attended. There was somewhat of an innovation in that the ladies were also present. We are inclined to think that this will probably serve as a precedent for future banquets.

A very delightful entertainment program for the women was also presented by the wives of the doctors in the Western Montana Medical Society and the Women's Auxiliary. This is, we believe, the first state meeting at which the Auxiliary has also conducted an official meeting.

Panel Discussions

One of the most interesting and valuable features of the session was the panel discussions. It is believed that we could have had twice as many present at each luncheon had there been facilities to handle a larger group. Three panel discussions were held on Thursday and two on Friday. A list of the panel discussions follows:

Thursday, July 9, 12:15 P. M.: Room A—Surgery of the Chest—Dr. Cameron Haight, speaker. Room B—Management of Perforated Appendix—Dr. J. K. Ransom, speaker. Room C—Pelvic Disease in the Female—Dr. Normal K. Miller, speaker. Friday, July 10, 12:15 P. M.: Room A—Diseases of the Blood—Dr. C. C. Sturgis, speaker. Room B—Vitamins—Dr. H. B. Lewis, speaker.

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At a luncheon meeting held Wednesday, July 10, secretaries and presidents of the various county medical societies got together and spent a profitable hour discussing the affairs of county medical societies.

They were briefly addressed by Dr. Herbert T. Caraway, Yellowstone Valley Medical Society, Dr. M. A. Shillington, Southeastern Montana Medical Society, and Dr. F. F. Attix, Fergus County Medical Society.

Minutes of the Sixty-Fourth Annual Meeting of the Council of the Montana State Medical Association

The Sixty-fourth Annual Meeting of the Council of the Montana State Medical Association was called to order by President W. E. Long at the Florence Hotel in Missoula, Tuesday, July 7, at 8 o'clock P. M., the following Councillors being present:

Drs. J. H. Garberson, A. E. Brewer, E. D. Hitchcock, H. W. Gregg, L. G. Dunlap, S. A. Cooney and Allen Foss.

The Council chose Dr. W. E. Long as chairman. Minutes of the last meeting were read and approved. The Secretary then made his annual report, a copy of which is included as a part of these minutes. Upon motion regularly made, duly seconded, and unanimously carried the report was accepted.

The Medical Publications Committee, of which Dr. Foss is chairman, recommended that the Journal-Lancet be continued as our official journal. Upon motion regularly made, duly seconded, and unanimously carried, it was resolved that "The Association enter into a contract with the Journal-Lancet for a period of five years to furnish two hundred or more subscriptions to designated members of the Association for $1.75 per year."

After a general discussion, it was moved by Dr. Dunlap and seconded by Dr. Gregg that the Council recommend to the House of Delegates that the state dues of members be increased from $8.00 to $10.00 per year beginning January 1, 1943. The motion was unanimously carried.

It was moved by Dr Dunlap and seconded by Dr. Garberson that Mr. Toomey be retained as attorney for the Montana State Medical Association during the year 1943 at a fee of $300. The motion was unanimously carried.

It was regularly moved, duly seconded, and unanimously carried, that no Journal be sent to the members of the Association who are in the armed service.

Each of the Councillors present gave a report of the conditions of his counties. These reports were freely discussed by the members present.

Dr. A. Foss and Dr. A. E. Brewer were appointed an auditing committee to audit the books of the Association.

There being no further business to come before the Council, the meeting adjourned.

Secretary's Report to Council

Although it was decided at the last annual session that the Montana State Medical Association should not employ legal counsel for the year, so many occasions arose in which your officers found the need of legal counsel, that they requested authority from the Council to again retain Mr. E. G. Toomey of Helena. Mr. Toomey was retained at the same annual rate of $300.00. He has during the year advised with your officers from time to time, and has consented without additional charges, to consult with council for the State Board of Medical Examiners.

Your attention is called to the fact that our contract with the Journal-Lancet expires at this time, and it becomes a duty of the Council to determine whether or not we should enter into a contract with the Journal-Lancet or some other journal, to be sent to our members. It has been the custom to send only one or two copies of the Journal to any one office regardless of the number of doctors in that office. Too, it would be impossible to send a journal to every member of the Association without either increasing our fees or curtailing other activities of the Association.

Your attention is called to the fact that there will be a marked decrease in revenue for the ensuing year, due to the fact that members who join the army are charged no state dues for the duration and one year thereafter. If we are to carry on the regular activities, an increase in dues will be necessary.

During the past year, one of the county societies to which a charter had been issued, has become inactive. I refer to Blaine county. Only two men in this county are paying dues to the State Association, and only one of them is a member of the Hill County Medical Society. In my opinion, this Society was formed for the sole purpose of permitting its members to enter into a contract with the F.S.A. I recommend that its charter be revoked.

The other county society to whom a charter was issued two years ago, namely Lake county, is functioning very well, with all members paid up.

The financial statement which has been distributed to the various members of the Council, constitutes, perhaps, the most important part of this report.

Respectfully submitted,
Thos. F. Walker, M.D., Secretary
Montana State Medical Association.

FINANCIAL REPORT OF MONTANA STATE MEDICAL ASSOCIATION

June 15, 1942

RECEIPTS

Lewis and Clark County Medical Society	$ 308.00
Silver Bow County	400.00

Cascade County	376.00	
Western Montana	424.00	
Northeastern Montana	224.00	
Great Falls National Bank, loan	1,000.00	
Northcentral Montana	142.00	
Mount Powell	168.00	
Madison County	72.00	
Southeastern Montana	264.00	
Flathead County	160.00	
Thomas F. Walker, M.D., refund	121.82	
Interest on Bonds	150.00	
Yellowstone Valley	416.00	
Chouteau County	32.20	
Western Air Express, refund	2.31	
Hill County	80.00	
General Electric X-Ray Corp.	25.00	
Borden's Milk Co.	50.00	
Sego Milk Co.	50.00	
Mead Johnson & Co.	50.00	
Lederle Laboratories	50.00	
Sandos Chemical Works	25.00	
Riggs Optical Co.	50.00	
American Optical Co.	50.00	
Fergus County	88.00	
Gallatin County	144.00	
Musselshell County	40.00	
Lake County	56.00	
Procurement & Assignment Committee, refund	13.53	
Park-Sweetgrass County	80.00	
Total Receipts		$5,111.86
Cash on hand, June 15, 1941		1,228.11
Total		$6,339.97

EXPENDITURES

Expense, 1941 meeting		$ 986.85	
Speakers	$459.22		
Expenses, Luncheons: Executive Committee, State Board of Medical Examiners, State Board of Health	18.70		
Telephone	5.40		
Hotel rooms	70.00		
Stenographer for reporting meeting, etc.	45.75		
Pre-banquet refreshments	53.00		
Meeting room and miscellaneous, Rainbow Hotel	137.95		
Miscellaneous expenses, Secretary	6.00		
Programs	190.83		
Expenses, Delegate to A. M. A.		160.95	
Expenses, Cancer Committee		29.15	
Mimeograph work	$ 18.70		
Postage and miscellaneous	10.45		
Medical Economics Committee		27.51	
Traveling expenses members to meeting in Helena	$ 9.50		
Traveling expenses, Dr. J. P. Ritchey incurred during 1939	18.01		
Tribune Printing and Supply		70.45	
Mimeograph paper	$ 8.80		
Envelopes	20.85		
Pencils	1.00		
Carbon	2.50		
Stencils	6.30		
Letterheads	18.45		
Miscellaneous supplies	4.55		
Mimeograph ink	2.50		
Membership cards	5.50		
Western Union, telegrams		7.98	
Great Falls National Bank		30.10	
Interest	$ 21.00		
Rental of Safety Deposit Box	3.33		
Expenses, proposed bond sale	2.37		
Service charges	3.40		
Hospital Service Association, loan		1,000.00	
Flowers for funerals of members		26.20	
Auditing of books		115.00	
Stamps		51.64	
Miscellaneous office supplies		1.00	
Secretary's bond		20.00	
Refunds for over-payment of dues		10.00	
Advance expenses, 1942 meeting		11.00	
Floor plans	$ 8.00		
Photo of floor plans	3.00		
Kellogg Company		21.82	
Note: Error, refunded by Dr. T. F. Walker.			
Western Air Express		19.32	
Travel expenses, Executive Committee.			
Attorney's retainer fee		300.00	
JOURNAL-LANCET, 280 subscriptions		490.00	
Expenses of Procurement and Assignment Committee		120.04	
Telephone	$ 12.80		
Telegrams	6.40		
Plane fare	31.42		
Hotel	16.60		
Railroad fare	13.19		
Meals	7.30		
Gas and oil	9.35		
Stamps	1.18		
Envelopes	.75		
Cash advanced (refunded)	11.60		
Telephone and telegram	1.42		
Tips	.50		
Refund (cash advanced)	1.93		
Pullman fare	3.10		
Stationery	.65		
Stencil	.35		
Taxi	1.50		
Books and pamphlets		13.00	
Dr. Thomas F. Walker, salary		600.00	
Dr. Thomas F. Walker, traveling expenses		155.42	
Livingston	$ 7.20		
Missoula	15.00		
Chicago (refunded)	100.00		
Helena, 4 trips	33.22		
Telephone		80.74	
Mimeograph paper		1.10	
Expenses Officers' Visit, 1942		166.50	
Meals	$ 28.25		
Hotels	65.15		
Railroad fare	17.30		
Pullman	6.20		
Tips	6.35		
Gas and oil	43.25		
Total expenditures			$4,515.77
Cash on hand, June 15, 1942			1,824.20
Total			$6,339.97

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Notes Receivable, Montana Hospital Service Association	$1,000.00	
Cash on hand, June 15, 1942	1,824.20	
Bonds on hand, June 15, 1942, par value	5,000.00	
		$7,824.20
Note Payable to Great Falls National Bank		1,000.00
Net Worth		$6,824.20

MONTANA STATE MEDICAL ASSOCIATION ROSTER--1942

Membership by Districts

CASCADE COUNTY MEDICAL SOCIETY

Andrews, F. L.
Anderson, C. E.
Allred, I. A.
Bateman, H. W.
Blankenhorn, C. E.
Bresee, C. J.
Crary, L. S.
Craigo, F. H.
Davis, R. C.
Durnin, R. B.
Fuller, H. W.
Gleason, A. L.
Greaves, J. P.
Gibson, H. V.
Hitchcock, E. D.
Holzberger, R. J.
Howard, L. L.
Hurd, F. D.
Hall, C. M.
Hall, E. L.
Irwin, J. H.
Johnson, A. C.
Keenan, F. E.
Larson, E. M.
Little, C. F.
Logan, P. E.
Lord, B. E.
Layne, J. A.
Mayland, L. L.
McBurney, L. R.
MacGregor, H. J.
MacGregor, R. J.
MacGregor, J. C.
McGregor, J. F.
McPhail, F. L.
Nagel, C. E.
Peterson, C. H.
Porter, E. M.
Richardson, R. B.
Russel, R.
Shephard, H. C.
Schemm, F. R.
Setzer, G. W.
Silvernale, F. P.
Strain, Earle
Templeton, C. V.
Vasco, J. R.
Walker, D. V. H.
Walker, T. F.
Waniata, F. K.
Weisgerber, A. L.
Williams, W. T.

CHOUTEAU COUNTY MEDICAL SOCIETY

Anderson, E. L.
Bassow, C. L.
Cooper, D. J.
Worstell, G.

FERGUS COUNTY MEDICAL SOCIETY

Alexander, J. L.
Attix, F. F.
Deal, A. W.
Eck, Raymond
Elliott, J. J.
Freed, H.
Gans, E. M.
Gans, E. W.
Gans, P. J.
Herring, J. H.
Johnson, R. G.
Porter, E. S.
Soltero, J. R.
Welden, E. A.
Wilder, C. W.
Wallin, C. C.

FLATHEAD COUNTY MEDICAL SOCIETY

Bottorf, M. W.
Borkon, M.
Brassett, A. J.
Cairns, J. M.
Clark, C. A.
Conway, W. Q.
Cockrell, E. P.
Burns, M. O.
Delaney, J. R.
Dodge, A. A.
Griffis, L. G.
Huggins, H. D.
Holcomb, M. D.
Kell, W. A.
Lamb, J. A.
Lees, A. T.
Liest, J.
Moore, T. B., Jr.
Munro, A. T.
Martin, C.
Ross, F. B.
Svore, G. R.
Simons, J. B.
Stewart, R. M.
Taylor, W. W.
Towne, R. L.
Weed, V. A.
Wright, G. B.

GALLATIN COUNTY MEDICAL SOCIETY

Brewer, A. D.
Bole, W. S.
Bradbury, J. T.
Craft, C. B.
Eneboe, P. L.
Grigg, E. R.
Heetderks, B. J.
Keeton, R. G.
Kearns, E. J.
Maillet, L. L.
Phillips, J. H.
Sabo, F. I.
Scherer, R. G.
Seitz, R. E.
Seerley, C. C.
Smith, C. S.
Sigler, R. R.
Williams, R. A.
Whitehead, E. W.

HILL COUNTY MEDICAL SOCIETY

Almas, D. J.
Aubin, F. W.
Benke, R. A.
Forster, W. L.
Hamilton, W. F.
Houtz, C. S.
Hoon, A. S.
Jestrab, G. A.
Lacey, W. A.
MacKenzie, D. S., Sr.
MacKenzie, D. S., Jr.
McCannel, W. A.
Sussex, L. T.

LAKE COUNTY MEDICAL SOCIETY

Armour, G. E.
Brooke, J. M.
Dimon, J.
Koehler, H. L.
Mathews, T. A.
Noble, P. C.
Tanglin, W. G.
Teel, H. M.
Richards, J. L.
Venneman, F. W.

LEWIS & CLARK COUNTY MEDICAL SOCIETY

Bierman, I. M.
Bayles, R. G.
Berg, D. T.
Barbour, G. H.
Cooney, S. A.
Cashmore, W. H.
Copenhaver, W. M.
Flinn, J. M.
Farner, L. M.
Gallivan, E. L.
Jump, C. F.
Hershey, E.
Hawkins, T. L.
Hall, L. F.
Klein, O. G.
Kilbourne, B. K.
Lindstrom, E. H.
McElwee, J. C.
McCabe, J. J.
Monserrate, D. N.
Mears, C. M.
Morris, R. W.
Nash, F.
Shearer, B. C.
Smith, M.
Thompson, J. G.

MOUNT POWELL MEDICAL SOCIETY

Anderson, G. A.
Bolton, L. R.
Crowley, L. G.
Dunlap, L. G.
Downey, D. E.
Getty, R. W.
Holmes, G. V.
Kargacin, T. J.
Knight, A. C.
Lieurance, E.
Long, W. E.
Malee, J. J.
Noonan, J. H.
O'Rourke, J. L.
Pampell, B. L.
Place, B. A.
Snodgrass, M. R.
Terrill, F. I.
Tyler, K. A.
Unmack, F. L.

MADISON COUNTY MEDICAL SOCIETY

Burns, W. J.
Clancy, D. F.
Dyer, R. H.
Farnsworth, R. B.
Packard, L. R.

MUSSELSHELL COUNTY MEDICAL SOCIETY

Bennett, A. A.
Brogan, R. E.
Crouse, S. A.
Fouts, E. R.
Lewis, G. A.
O'Neill, R. T.
Person, E. C.

NORTHCENTRAL MONTANA MEDICAL SOCIETY

Bosshardt, O. A.
Cannon, P. S.
DuBois, W. L.
Elliott, L. L.
Meadows, W. A.
Neraal, P. O.
Olson, N. A.
Power, H. W.
Paterson, W. F.
Robinson, W. C.
Schrader, H. F.
Spatz, J. M.
Whetstone, S. D.

NORTHEASTERN MONTANA MEDICAL SOCIETY

Agneberg, N. O.
Benson, O. G.
Cloud, H. B.
Cockrell, F. L.
Habel, W. H.
Knapp, R. D.
Knierim, F. M.
Krogstad, L. T.
Larson, C. B.
Munch, D. J.
Mittleman, E. J.
Peterson, W. M.
Ryde, R. E.
Studor, D. J.
Storkan, J. C.
Schweizer, H. W.
Smith, A. N.

PARK-SWEETGRASS COUNTY MEDICAL SOCIETY

Baskett, L. W.
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Garvey, J. E.
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Joesting, H. C.
James, H. H.
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Schwartz, S. E.
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Saam, Sarah F.
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Morrill, R. A.
Noonan, E. F.
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Duffalo, J. A.
Fredrickson, C. H.
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Foss, A. R.
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Hall, E. L.	Great Falls
Hall, E. C.	Laurel
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Hall, L. F.	Helena
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Hamilton, W. F.	Havre
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Hammerell, J. J.	Billings
Hanbidge, T. H.	Darby
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Hayward, H. C.	Hamilton
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Hesdorffer, M. B.	Missoula
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Holmes, G. V.	Warm Springs
Holmes, J. T.	Missoula
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Kane, R. C.	Butte
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Leeper, D. D.	Laurel
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MacKenzie, D. S., Sr.	Havre
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Peterson, R. F.	Butte
Peterson, W. M.	Plentywood
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Saam, T. W.	Butte
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Schwartz, S. E.	Butte
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Seitz, R. E.	Bozeman
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Seivers, R. E.	Butte
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Smith, M. K.	Helena
Smith, W. P.	Columbus
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Thornton, W. T.	Missoula
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Turman, C. F.	Missoula
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Walker, R. E.	Livingston
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Wernham, J. I.	Billings
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Williams, F. J.	Butte
Williams, R. A.	Manhattan
Williams, W. T.	Malta
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R. N. Morgan	Butte
W. F. Morrison	Missoula
E. S. Murphy	Missoula
J. D. Morrison	Billings
Chas. Nagel	Great Falls
P. C. Noble	Missoula
J. P. Ohlmacher	Missoula
F. W. Paul	Big Timber
C. W. Pemberton	Butte
C. H. Peterson	Great Falls
G. L. Routledge	Dillon
A. C. Rathman	Billings
L. G. Russell	Billings
J. A. Shaw	Billings
B. C. Shearer	Helena
L. T. Sussix	Havre
H. C. Shephard	Hughesville
G. D. Sale	Missoula
L. B. Stephan	Missoula
H. W. Schweizer	Poplar
W. T. Smith	Colombus
A. R. Sievers	Butte
W. G. Tanglin	Polson
R. D. Weber	Missoula

(List is as of October 1, 1942, subject to subsequent corrections as often some time elapses between acceptance of commission and notification of secretary.)

Woman's Auxiliary to the Montana State Medical Association

The Women's Auxiliary to the Montana State Medical Association met in Missoula July 8, 9, 10. Mrs. David Berg, vice-president, presided during the absence of the president, Mrs. L. F. Hall. Delegates were present from Helena, Great Falls and Missoula as well as other cities where auxiliaries are not yet organized.

Routine business was transacted. Officers elected for the ensuing year 1942-43 are:

President—Mrs. W. J. Marshall, Missoula.
Vice-president—Mrs. David Berg, Helena.
President-elect—Mrs. Logan, Great Falls.
Secretary—Mrs. L. H. Brewer, Missoula.
Treasurer—Mrs. A. A. Dodge, Kalispell.

Mrs. F. N. Haggard of San Antonio, Texas, president of the Women's Auxiliary to the American Medical Association, addressed the luncheon meeting Thursday.

The convention adjourned to meet in 1943 at Billings, Montana.

PRESIDENT'S REPORT, WOMEN'S AUXILIARY

As President of the Women's Auxiliary to the Montana State Medical Association, I submit the following report for the year 1941-42.

Your president sends greetings to the members of the Montana Auxiliary, to the wives of visiting doctors and to our guests of honor, our National President, Mrs. Mosiman, and our National President-elect, Mrs. Haggard, and regrets that she is unable to be with you.

The year has seen three auxiliaries organized and functioning, and becoming the nucleus for greater auxiliary work in Montana.

Your president visited the Western Montana Auxiliary in November. In April she presided at a board meeting called in Helena for the purpose of outlining the program for the state convention, and a general discussion of auxiliary work.

She has been a member of the board of directors for the Women's Field Army for the Control of Cancer.

She has carried out all instructions received from the National Officers, and has personally attended to 45 pieces of correspondence.

She has, upon the resignation of the first vice-president, endeavored through correspondence and personal contact, to stimulate an interest in further auxiliary work.

At this time, she wishes to express her sincere thanks to each and all of her officers for their splendid help and coöperation.

As she looks back upon her year as your president, the words of Cecil Rhodes seem most appropriate, "So much to do, so little done."

Respectfully submitted,
ALICE BRYANT HALL.

Comparative Therapeutic Value and Toxicity of Various Types of Vitamin D

Chapman Reynolds, M.D.[†]
New Orleans, Louisiana

CLINICAL reports of the toxic effects of massive doses of vitamin D, on the one hand, and of the benefit of such therapy to arthritic patients, on the other, have been so conflicting that some interpretation should be offered the medical profession with regard to this form of medication.

Physicians should be reminded that preparations of high potency are the result of activation of vitamin D precursors. There are many of these, of which ergosterol and 7-dehydrocholesterol have so far been found most fruitful. All known precursors have a common chemical relationship, being derivatives of cyclopentenophenanthrene. Yet relatively minor changes in structural conformation and substitutions result in widely different pharmacological activity. The basic structure of the precursor group is found also in the male and female sex hormones, the active principle of adrenal cortex, and a number of cardiac aglucones.

A fact of importance, and apparently not so well known, is that "the progressive irradiation of a single vitamin D precursor can result in the formation of a series of compounds, each member of which has a different degree and type of physiological activity."[1]

As Windaus and associates pointed out some years ago, the various irradiation products of ergosterol may have an action other than antirachitic. While the series, as a whole, has a marked influence on calcium metabolism, its members are not equally antirachitic, and some are many times more toxic than others.

Early impressions of the use of irradiated ergosterol, especially from the German clinics, were that there was little margin between therapeutic and toxic dosage. We can now say with some degree of assurance that this proximity was the result of a non-uniform activation of the precursor, yielding an uncontrolled mixture of calciferol and toxisterol type compounds. By the latter, bone may be decalcified, resulting in hypercalcemia, and causing the unwanted calcifications so stressed in the earlier reports.

The various workers for the most part have been using two different types of activated ergosterol compounds—one, made by ultraviolet irradiation of ergosterol, which was not designed to obtain a product for massive dosage and which should not be used in the treatment of arthritis; the other made by electric current activation of heat-vaporized ergosterol (Whittier process). By the latter procedure, only one-sixth of the yield by the former is obtained.[2] Favorable and relatively safe action has been uniformly gotten with the heat-vaporized electric current activated product. Yet it is interesting to note how many clinicians using these various preparations are unaware that there is a difference in the activating process through which the high potency compounds are obtained.

In this paper we are concerned with two important questions: (a) beneficial effect in arthritic patients; (b) incidence of toxicity, from the use of large doses of vitamin D.

I. The Question of Benefit

There are a great many reports of clinical trial of vitamin D in arthritis which are unfavorable. Among those who have used ordinary ultraviolet irradiated ergosterol, Vrtiak and Lang[3] treated twenty patients with daily doses of viosterol (ultraviolet irradiated ergosterol) of from 150,000 to 250,000 U.S.P. units of vitamin D. Two patients showed marked improvement, six moderate improvement, four slight improvement and eight no improvement. They concluded that these results are similar to those obtained with a number of other methods of treatment or with palliative measures.

Wyatt, Hicks and Thompson[4] used vitamin D prepared as irradiated ergosterol in sesame oil, supplied for experimental purposes by the National Institute of Nutrition, Los Angeles, and viosterol and vitamin D in propylene glycol. The percentage of clinical improvement noted was definite and clear-cut in 20 per cent. In eight patients, or 20 per cent of the total series, treatment was abandoned entirely because of unfavorable reactions, while the remaining 60 per cent showed no specific benefits that could be attributed to vitamin D therapy.

Abrams and Bauer's[5] widely quoted report confirms these findings that the administration of massive doses of vitamin D in rheumatoid arthritis is of little or no value in altering the course of the disease. These authors administered vitamin D in the form of drisdol for a short time to the first five patients in the series. These and the remaining patients subsequently received a more concentrated preparation, crystalline vitamin D in propylene glycol or in sesame oil, with results that were almost entirely negative. They were unable to exceed a dose of 200,000 U.S.P. units daily of the crystalline vitamin D in propylene glycol administered in milk without encountering toxic symptoms.

It may be also concluded from Sternberg's report[6] that an effect of massive doses in chronic arthritis was non-specific, and any improvement noted would fall in line with that following the use of many other non-specific remedies.

In 1939 the Council on Pharmacy and Chemistry of the American Medical Association[7] concluded that clinical evidence does not warrant the claim that massive doses of vitamin D are of benefit in chronic arthritis, in allergic disorders, or in psoriasis. (The Council stated, however, that it believed further studies should be conducted, but because of possible toxic effects of large doses of vitamin D, such studies should be made only in clinics where close supervision is possible.)

[†] Assistant professor of pharmacology, Louisiana State University School of Medicine.

On the other hand an entirely different picture has been presented in instances where the heat-vaporized electric current-activated preparation (Whittier process) has been used.

Livingston,[8] using Whittier process high concentrate vitamin D, reported that progressive improvement had been noted in from one week to two months of treatment, with decreased pain, greater mobility, reduction of deformity and improved muscular tone associated with increased muscular strength and a general improvement of health. The depressed mental attitude of most of these patients became hopeful and their appetites returned. Twenty-two cases of severe arthritis of various types were treated only with vitamin D or with vitamin D plus fever therapy. Nineteen of these patients showed clinical improvement. One patient discontinued the treatment, and two showed no improvement.

Using the same preparation, Farley[9] reported from a group of 27 private patients that not one of this group had failed to respond in some degree to the high vitamin D therapy. In this group not only were the symptoms of pain and reduced movement of joints relieved, but the general nutritive state was greatly improved. This was evident by the gain in weight, appearance, and, a feeling of euphoria.

Of another series of 87 patients,[10] all who continued treatment for two months or longer, in accordance with the prescribed management, showed considerable improvement. In most cases the improvement was so marked that it enabled these people to resume their business activities and occupations. Most of the discharged patients continued to appear physically normal. There was evidently little or no tendency toward a return of the arthritic process. All patients responded well to the management established. Unfavorable results did not appear in a single instance.

In a restudy[11] of 15 patients who had received or were receiving this same product for arthritis, Farley concluded that the results obtained were at variance with those of Abrams and Bauer, but were in complete accord with those of Livingston and Steck. In no instance did the blood calcium rise to dangerously high levels, and in only one patient was there an elevation of the serum calcium level above 11.27 mg. per cent. In most patients the blood calcium level was less than 10 mg. per cent, even after the administration of large doses of vitamin D for many months or years. Farley found, with others, that the benefit obtained with this vitamin D preparation in the treatment of arthritis cannot be obtained with ordinary ultraviolet irradiated ergosterol or certain other forms of vitamin D.

Always[12] there occurred a definite rise in the number of erythrocytes up to the normal level, while the hemoglobin level followed, in general, the course of the erythrocytes. In most of these cases, there occurred improved functional activity, increased strength, and a general sense of well-being.

In 1940 Snyder and Squires[2] made a preliminary report on a rigidly supervised two-year study of a group of twenty-three patients with severe chronic arthritis who were treated with activated ergosterol prepared by the Whittier method. Their findings indicated that this drug has been of benefit in most of these patients in varying degrees. In a relatively high percentage of cases, the degree of clinical improvement has been marked and sustained.

These authors found the results of this preliminary study sufficiently favorable to justify further intensive study of the particular form of high-dosage vitamin D agent used, as well as the broader problem of vitamin D, in general, in the treatment of arthritis.

In 1941, the same authors[13] reported all of their cases had suffered from arthritis for from two to five years before receiving ertron, which is ergosterol activated by electrical discharges in a low pressure chamber. Each had proved to be resistant to most of the accepted forms of therapy prior to the administration of this drug. Most of the patients during this follow-up period were able to return to their normal gainful activities either without any medication or on a small maintenance dose of ertron.

Snyder and Squires[14] have concluded, as a result of their careful study of this group, that a marked improvement occurred in a sufficiently large number of patients to establish definitely the value of this form of treatment in all forms of chronic arthritis. Following the early improved sense of well-being, there was diminution of soft tissue swelling, lessening or abolition of pain, increased range of motion, restoration of normal function, an increase in weight in the debilitated underweight individuals and a marked increase in the patients' endurance.

Reed, Struck, and Steck[15] treated a group of forty-five patients suffering with atrophic arthritis; seven patients with hypertrophic arthritis and three with a mixed type of infection were treated with 150,000–200,000 ertron units of vitamin D daily with specific measurable improvement in 74.5 per cent of cases, accompanied by reduced swelling and pain, increased mobility (active and passive), improved muscular tonus, and weight gain.

The antiarthritic activity seems to have been found only in the high concentrate preparation made by the Whittier process and is not due to antirachitic effect, per se.

II. The Question of Toxicity-Safety

Many references to severe toxic reactions have appeared in medical literature. These are found to have occurred when large doses of ultraviolet irradiated ergosterol were used. Thus Steck et al[16] reported that early experience with impure preparations of vitamin D, particularly abroad, had led to a great deal of misunderstanding and fear of overdosage on the part of those who have had little knowledge of the fundamental mechanisms involved—a point adequately discussed by Bills. They feel that most of the earlier work should be disregarded in view of the effects produced by the highly purified preparations now available.

According to Bills,[17] the toxic properties peculiar to one particular brand of irradiated ergosterol solution were the subject of numerous reports in medical literature during 1928 and 1930. The German manufacturer of the offending product had obtained two patents, one British and the other American, the specifications of which are most revealing. Under these specifications, the irradiation of ergosterol was continued just until the absorption spectrum of what is now recognized as toxisterol attained its maximum.

From Pfannenstiehl[18] we learn that after a long period of days during which otherwise normally fed young rabbits were given orally the same small dose of only two drops of vigantol (1.0 per cent solution of irradiated ergosterol in olive oil) a number of animals (nine in all) died with the characteristic signs which he calls hypervitaminosis.

From an editorial in the *Journal of the American Medical Association,*[19] it may be concluded that beyond little doubt massive doses of irradiated ergosterol—quantities exceeding by a thousand times or more the minimal antirachitic requirement—may result in considerable impairment of nutrition, loss of weight, pronounced hypercalcemia, and abnormal calcium deposits in certain tissues and organs.

Vrtiak and Lang[3] treated twenty cases of atrophic arthritis with 150,000–200,000 daily units of viosterol. Nausea developed in all their patients, frequency of urination and nocturia in several. Albright, Butler and Bloomberg,[20] raising their daily dosage of a propylene glycol solution of crystalline vitamin D to approximately 300,000 units, found the serum calcium rose to 12.7. The urine was loaded with calcium and calcium casts as in cases of hyperparathyroidism. Similar figures and findings, including anorexia, nausea, vomiting, epigastric pain or distress, diarrhea, headache, drowsiness, polyuria, polydipsia, and nocturia are reported by Abrams and Bauer.[5] They did not feel justified in using more than 200,000 units.

Meanwhile Tumulty and Howard[26] in a recent review of the subject emphasized the danger of toxicity from ultraviolet irradiated ergosterol. The preparation they used was found to contain 50 per cent calciferol and 50 per cent of a mixture of lumisterol, tachysterol and toxisterol. They described the occurrence of a marked hypercalcemia and damage to the renal tubules in patients receiving this product.

There are contrasting expressions from users of the Whittier processed preparation. Thus Livingston[8] has used high dosage vitamin D therapy in cases with heart lesions, vasomotor instability, and other complications without untoward effects, and concludes from his observations made in this series that there is no contraindication to vitamin D or fever therapy so far as is known at this time. Farley[9,10,11] reported favorable results, seeing only minor symptoms at times when the daily dosage was 400,000. No severe toxic reactions were encountered and the serum calcium level was not elevated above the normal.

This form of vitamin in clinical as well as experimental work appears less toxic than other forms. According to Reed, Struck, and Steck, human toxic effects have been observed so rarely that there is little data on which to base any discussion. In only three patients out of 150 that have received it have symptoms of toxicity occurred.

Snyder and Squires,[2,13,14] who encountered no serious toxic manifestations, report that the occasional signs of intolerance that have followed the use of ertron have all been temporary. They have made a careful study of over 200 arthritic patients during the past six years. Rigid ophthalmological examination of the retinal vessels, as well as X-ray studies of the larger vessels have shown no demonstrable increase in the degree of calcification. This suggests that the preparation not only does not cause arteriosclerosis, but may be instrumental in arresting the process. Blood calcium levels were not appreciably altered, even during twelve months' treatment.

These and other indications of low toxicity are further corroborated by findings in other than arthritic conditions.

REPORTS OF USE OF MASSIVE DOSES OF VITAMIN D (WHITTIER PROCESS) IN OTHER THAN ARTHRITIC CONDITIONS

Vollmer[21] thus has treated cases of rickets and tetany with single massive doses without evidence of toxicity or damage, while, on the other hand, Hess and Lewis[22] found abnormally high percentages of blood calcium, sometimes associated with untoward symptoms.

Toxic effects produced by massive doses of irradiated ergosterol are also reported by Poncher et al.[23]

Further statistics by Wolf corroborate Vollmer, who encountered no toxic or ill effects. In Wolf's comprehensive study of this subject, active rickets in infants between the ages of 5 and 18 months was treated with a single massive dose (600,000 units) of vitamin D in the form of ertron. Such treatment effected a rapid therapeutic improvement in the patient clinically, serologically, and roentgenographically with no observable ill effects.

Since this work was published, Wolf (in press) administered single massive doses (600,000 units) of ertron to about one hundred additional babies for the prevention and treatment of rickets. He observed the same therapeutic effectiveness and complete absence of any toxic manifestations.

Meanwhile Krafka[25] has treated twenty-five patients with psoriasis over a period of two years without untoward symptoms or complaint of discomfort.

DISCUSSION AND SUMMARY

A study of the administration of large doses of vitamin D leads to the belief that contradictory findings indicate that various workers were using different types of preparations. It is strikingly evident, however, that massive doses of irradiated ergosterol bring about the development of toxic effects without clinical improvement of arthritic patients, while use of the electric-discharge activated heat-vaporized ergosterol (Whittier process) has consistently been followed by clinical improvement with frequent rehabilitation, and with negligible or no toxic manifestations even over prolonged periods of intensive treatment.

Such findings may be accounted for pharmacologically by the following points:

1. The difference in degree and type of physiological activity of a series of compounds resulting from progressive irradiation of a single vitamin D precursor.[1]

2. The presence of a large amount of toxisterol type compounds which has been demonstrated in some of the irradiated preparations.[17,26]

3. The fact that electric current activation is applied to heat *vaporized* ergosterol in the Whittier process. The yield of end products is much smaller (one-sixth) than that made by other methods. Activation of a homogenous vapor may yield a concentrated usable vitamin D, without the complicating presence of diluent or toxic undesirable by-products.

Bibliography

1. Goodman and Gilman: The Pharmacological Basis of Therapeutics, p. 1279, 1941.
2. Snyder, R., Garfield, and Squires, Willard H.: A preliminary report of activated ergosterol, N. Y. State J. Med., May 1, 1940, pp. 708-719.
3. Vrtiak, E. G., and Lang, R. S.: Observations on the treatment of chronic arthritis with vitamin D, J.A.M.A. 106:1162 (1936).
4. Wyatt, B. L., Hicks, R. A., and Thompson, H. E.: Massive doses of vitamin D in the treatment of arthritis, Ann. Int. Med. 10:534 (1936).
5. Abrams, N. R., and Bauer, W.: The treatment of rheumatoid arthritis with large doses of vitamin D: a critical evaluation, J.A.M.A. 111:1632 (1938).
6. Steinberg, C. L.: Massive doses of vitamin D in chronic arthritis, J. Lab. & Clin. Med. 24:17 (1938).
7. Report of Council on Pharmacy and Chemistry: J.A.M.A. 113:592 (1939).
8. Livingston, S. K.: Vitamin D and fever therapy in chronic arthritis, Arch. Physical Therap., X-ray, Radium 17:704 (1936).
9. Farley, Roger T.: Management of arthritis, Illinois M. J., Jan., 1937.
10. Farley, Roger T.: The treatment of arthritis with massive dosage of vitamin D, J. Am. Inst. Homeop. 31:405 (1938).
11. Farley, Roger T.: The influence of prolonged administration of high dosages of vitamin D upon the serum calcium of adults, Journal-Lancet 59:9:401 (1939).
12. Farley, R. T., Spierling, H. F., and Kraines, S. H.: A five-year study of arthritic patients, Industrial M. 10:341 (1941).
13. Snyder, R. G., and Squires, W. H.: Follow-up study of arthritic patients treated with activated vaporized sterol, N. Y. State J. M., p. 2332 (Dec. 1) 1941.
14. Snyder, R. G., and Squires, W. H.: A comprehensive study of fifty arthritic patients treated with activated vaporized sterol (ertron)—in press.
15. Reed, Struck and Steck: Vitamin D—Chemistry, Physiology, Pharmacology, Pathology, Experimental and Clinical Investigations, Univ. of Chicago Press, 1939.
16. Steck, I. E., Deutsch, H., Reed, C. I., and Struck, H. C.: Further studies on intoxication with vitamin D, Ann. Int. Med. 10:951 (1937).
17. Bills, C. E.: Chemistry of vitamin D in "The Vitamins," published by the American Medical Association, 1939.
18. Pfannenstiehl, W. W.: Beobachtung über die Wirkungen bestrahlten Ergosterins im Tierversuche, Münch. Med. Wchnschr. 75:1113 (1928).
19. Editorial: Irradiated ergosterol—a reminder, J.A.M.A. 92:2023 (1929).
20. Albright, F., Butler, A. M., and Bloomberg, E.: Rickets resistant to vitamin D therapy. Am. J. Dis. Children 34:529 (1937).
21. Vollmer, H.: Treatment of rickets and tetany with a single massive dose of vitamin D, J. Pediat., April, 1939.
22. Hess, A. F., and Lewis, J. M.: Clinical experience with irradiated ergosterol, J.A.M.A. 91:783 (1928).
23. Poncher, H. G., Hess, J. H., Dale, M. I., and Klein, R. I.: Viosterol (irradiated ergosterol), prophylactic and therapeutic dosage, J.A.M.A. 95:316 (1930).
24. Wolf, I. J.: Treatment of rickets with a single massive dose of vitamin D., J. Med. Soc. N. J. 38:346 (1941).
25. Krafka, J.: Vitamin D therapy in psoriasis, J. Med. Assn. Ga. 30:398 (1941).
26. Tumulty, P. A., and Howard, J. E.: Irradiated ergosterol poisoning, J.A.M.A. 119:233 (May 16) 1942.

Symposium on Tuberculosis Control*

INTRODUCTION

J. A. Myers, M.D.
Minneapolis, Minnesota

The Tuberculosis Committee of the American School Health Association was appointed in 1934. Since its beginning the chief project has been the control of tuberculosis in the school systems of the United States. Our work begins with kindergarten and ends with the graduation of seniors from high school in both private and public schools. At this point the work is taken over by the Tuberculosis Committee of the American Student Health Association, which limits its activities to colleges and universities.

At first we devoted our time to the study of the tuberculosis problem, both among the personnel and the children. A few surveys revealed that 1 to 2 per cent of personnel have clinical tuberculosis which should be treated. In the aggregate this means about 16,000 teachers. While the percentage found on a single examination is low, we were cognizant that periodic subsequent examinations would reveal many new cases. Thus, a campaign was begun to solve the tuberculosis problem among the personnel of the school systems of the United States. This consisted of testing with tuberculin all members of personnel, X-ray film inspection of the chest at least annually, of all reactors and making a complete examination of the chests of all whose X-ray inspection revealed shadows which might be due to tuberculosis. It was strongly recommended that all found to have the disease in clinical form be carefully studied and if it was progressive or in need of treatment, provision should be made at once for leaves of absence until it was safe for them to return, both from the standpoint of their health and that of their associates.

Observations showed that children under the age of twelve years rarely have the chronic clinical form of pulmonary tuberculosis in the contagious stage. However, during this age period each year a number develop the first infection type of tuberculosis as manifested by the tuberculin reaction. Therefore, the periodic administration of the tuberculin test was recognized as a procedure of extreme importance for two reasons: First, it immediately provides the trail of a case of contagious tuberculosis which should be found. Second, the tuberculin reaction indicates that the child is a potential case of clinical tuberculosis some time during adulthood and, therefore, should be placed on the list of those to have annual examinations when adult life begins.

Among children from twelve to eighteen years observation revealed that the reinfection type of tuberculosis does not become prevalent but appears with sufficient frequency to justify most careful annual examinations of all who react to tuberculin. In addition to examining the children in this age period themselves, seeking the source of infections among their adult associates has also proved profitable in many places.

When a satisfactory program was agreed upon, subcommittees were appointed in each state to keep the work constantly before the schools of their states. These subcommittees report to the central committee, which in turn analyzes the data and presents the findings throughout the nation from time to time.

Last year in San Antonio, Miss Strachan arranged for a breakfast meeting of the Tuberculosis Committee of the American School Health Association. The number of persons in attendance was far beyond our expectations and the program was well received. It was decided that a similar meeting should be held here in Philadelphia this year.

We have arranged a program with speakers from different parts of the nation. Each speaker has had long years of experience and has done a large volume of work on the subject chosen by him. These physicians will now make their presentations in the order of appearance on the printed program.

The Present Status of the Tuberculin Test

Esmond R. Long, M.D.†
Philadelphia, Pennsylvania

THE tuberculin test detects tuberculous infection regardless of its severity. The reactors include those actually ill with tuberculosis and those allergic to tuberculin as a result of simple infection from recent contact or from a contact that took place long ago.

Because of its power to discover tuberculous infection either of grave type, causing actual disease, or of mild type that has not progressed to illness, tuberculin is valuable for two purposes, namely, (1) case finding, i. e., location of true cases of tuberculosis, and (2) discovery of contacts, i. e., infected persons who might develop the disease in the future. Within the latter group are persons living in a household where there is an individual with active tuberculosis, and persons especially exposed, like nurses and medical students whose occupation may bring them into frequent association with patients suffering from this disease.

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*Arranged by the committee on tuberculosis of the American School Health Association and presented in the Junior Room of the Bellevue-Stratford Hotel, Philadelphia, May 8, 1942.

†Medical Director, the Henry Phipps Institute, University of Pennsylvania.

In the respects named the status of the tuberculin test is no different from what it has been for many years past. The doubts and questions that have occasionally been raised in recent years have to do with the choice of method, the best type of tuberculin to use, the dosage and the limits of specificity of the test.

One question is frequently raised: does a positive tuberculin reaction necessarily signify the presence of live bacilli in the body? The answer is no, for it can readily be shown by experiment in suitable animals, including man, that hypersensitiveness to tuberculin can be conferred by the injection of dead tubercle bacilli. Within recent years Freund[1] and others have written extensively on vaccination against tuberculosis by dead bacilli, a procedure leading regularly to the development of tuberculin allergy.

Under ordinary circumstances, however, dead bacilli, without accompanying live ones, are not apt to get into the body. On the other hand bacilli that have entered the body in the livestate, and their descendants, may in the course of time die out. The recent studies of Feldman and Baggenstoss[2] show that calcified tubercles of long standing may be sterile. It would be very difficult to determine how long tuberculin sensitiveness persists after the death of tubercle bacilli in such lesions. From the known fact that dead bacilli may confer allergy it is reasonable to suppose that the waning of hypersensitiveness after the cure of a tuberculous lesion is a process that occurs gradually. That it does occur we have abundant evidence. The studies of Dahlstrom[3] showed that many clinic patients, once positive to tuberculin, eventually lost their power to respond to tuberculin and that the reversion to the negative state was far more common in those out of contact than in those still exposed and therefore likely to be reinfected from time to time.

One significant deduction from such studies is that a visible arrested tuberculous lesion and a positive tuberculin reaction are not necessarily related. The patient in such a case might have lost the sensitiveness that resulted originally from the lesion now healed, and have acquired a new sensitiveness as a result of subsequent infection with tubercle bacilli in a different part of the body.

In the immediate future this possibility will grow in significance. There is good reason to believe that many people infected back in the days of more widespread dissemination of tuberculous infection than exists today will lose their hypersensitiveness in these days of lessened opportunity for contact. The fresh development of sensitiveness in such patients, if detected, will throw light on new contacts and in the opinion of some authors, like Mayer and Rappaport[4] may give warning of impending disease.

As indicated above, questions are frequently raised with reference to method of administration, type of tuberculin, and dosage. Intracutaneous injection, i. e., the Mantoux test, is commonly accepted as the standard method because it is quantitative. With proper technic a known amount of a material of known concentration is introduced in a sharply delimited space. The Pirquet method is much less exact, and appears to be disappearing from usage in this country. The patch test on the other hand, because of its convenience and freedom from the element of pain, is increasing in popularity. It cannot be expected to be as accurate as the Mantoux test because it is dependent on absorption of material simply pressed against the skin, an absorption that must in the very nature of things be governed by many variables. But biological response is in general less sensitive than that observed in simple chemical reactions and actually patch test surveys, carried out with approved technic, usually show a striking similarity to the results of Mantoux test surveys.

It would seem that the patch test may have exceptional advantage in the practice of medicine where the personal factor of the pain of the test may be more weighty than in surveys in which this factor is discounted by example, and it may be useful in individual practice where the relative infrequency of testing renders the preparation of dilutions a nuisance. In mass survey work, on the other hand, the Mantoux test has the advantages of relative cheapness and that quantitative accuracy to which attention has already been called.

In the Mantoux test there is a choice of tuberculin preparations, between any one of the several preparations of Old Tuberculin on the market and the Purified Protein Derivative of Tuberculin, which has been recognized as standard by the National Tuberculosis Association and the U. S. Public Health Service. The questionnaire surveys conducted by the American Student Health Association during the past few years indicate that the Purified Protein Derivative of Tuberculin is gradually replacing Old Tuberculin in the college programs, which are perhaps the largest tuberculin surveys in the country. This trend has become more rapid with the lessening cost of the Purified Protein Derivative.

The latter product itself has undergone slight changes in its method of manufacture and potency since its original development in 1934. The final product, described by Seibert and Glenn,[5] is the strongest product yet prepared; it has been made available in a state of high purity, and is carried by the laboratories of the U. S. Public Health Service in such quantity as to permit long use as the national standard.

The question of suitable dosage of the Purified Protein Derivative has been lengthily studied by investigators in the U. S. Public Health Service. The investigations of Furcolow, Hewell, Nelson, and Palmer[6,7] show that an overwhelming majority of all patients with clinical tuberculosis react to small doses of the Purified Protein Derivative, and that relatively small doses are effective in the majority of tuberculous contacts who might be assumed to have acquired infection if not actual clinical disease. On the other hand, it appeared clear from their results that increasing the dosage soon brings the test into the range of nonspecificity, where persons presumably free from present or past contact with tuberculosis react. Their results indicated that 0.0001 mg. of Purified Protein Derivative represents approximately the critical level, lesser doses being highly specific and higher doses causing an increasing percentage of nonspecific reactions.

Studies at the Henry Phipps Institute have repeatedly demonstrated the effectiveness of the standard first dose of the Purified Protein Derivative in eliciting a positive tuberculin reaction in cases of clinical tuberculosis. In a recent series, results quite similar to those reported by Furcolow, Hewell, Nelson, and Palmer were obtained. The two standard doses were used on 366 diseased but unselected patients, of whom 229 had clinically established pulmonary tuberculosis, and 137 various types of nontuberculous disease. Of the 229 tuberculous patients 227 or 99.1 per cent reacted to the first dose. The other two patients reacted to the second of the standard doses.

Of the 137 patients with nontuberculous disease, 89 reacted to the first dose and 34 to the second, while 14 did not react to either.

Of the two tuberculous patients who required the second dose to elicit a positive reaction, one had minimal and one moderately advanced disease. All cases of far advanced tuberculosis in this series reacted positively, although it is within this group that allergy is often depressed. All 27 cases of primary active tuberculosis reacted positively to the first dose.

It is worth noting that in the patients with nontuberculous disease the frequency of positive reaction increased with age, as it does as a rule in groups surveyed at random. Thirty per cent of children under 14 reacted to the first dose and 33 per cent to the second, while 37 per cent were negative. In persons over 29 years in this group 80 per cent reacted to the first dose and 20 per cent to the second, no members of this group being negative to tuberculin.

Another series of subjects was examined for comparison, including cases of established clinical tuberculosis and healthy nontuberculous persons, most of whom were contacts. In this study three doses of Purified Protein Derivative were used, including the standard first and second doses and an intermediate dose of 0.0001 mg. In the group there were 28 cases of clinical tuberculosis, in all of which the reaction was positive to the first dose of Purified Protein Derivative. In the nontuberculous persons, 190 in number, the response was variable. The older the patients were, the more likely they were to react to the Purified Protein Derivative. Sixty per cent reacted to the first dose and 32 per cent to large doses. That is, 92 per cent of this group, consisting largely of contacts, reacted. The results were somewhat at variance with those reported by Furcolow, Hewell, Nelson, and Palmer in that the intermediate dose of 0.0001 mg. yielded only 6 of the 26 per cent reacting to doses stronger than the first. Whether there was an element of nonspecificity in the other 20 per cent could not be determined. Most of the group were contacts. It is interesting to note that of the 16 patients who failed to react even to the second dose, and all of whom were young, 14 were recent contacts.

SUMMARY

The status of the tuberculin test in the field of public health practice has not been changed in recent years, but question as to its precise value has led to better definition of the specificity of the test. The accuracy of the most highly purified tuberculin preparation, the Purified Protein Derivative, and the range of specificity in respect to dosage have been well worked out. Very small doses of the latest and purest product, now accepted as the national standard, detect practically all cases of clinical tuberculosis and doses only slightly larger elicit reaction in the great majority of significant contacts.

REFERENCES

1. Freund, J., Casals-Ariet, J., and Genghof, D. S.: The synergistic effect of paraffin-oil combined with heat-killed tubercle bacilli, J. Immunol. 38:67, 1940.

2. Feldman, W. H., and Baggenstoss, A. H.: The residual infectivity of the primary complex of tuberculosis, Am. J. Path. 14:473, 1938.

3. Dahlstrom, A. W.: The instability of the tuberculin reaction: observations on dispensary patients with special reference to the existence of demonstrable tuberculous lesions and the degree of exposure to tubercle bacilli, Amer. Rev. Tuberc. 42:471, 1940.

4. Mayer, E., and Rappaport, I.: See prevention of tuberculosis among recruits, correspondence, J.A.M.A. 115:1295, 1940.

5. Seibert, F. B., and Glenn, J. T.: Tuberculin purified protein derivative: preparation and analyses of a large quantity for standard, Amer. Rev. Tuberc. 44:9, 1941.

6. Furcolow, M. L., Hewell, B., Nelson, W. E., and Palmer, C. E.: Quantitative studies of the tuberculin reaction. I. Titration of tuberculin sensitivity and its relation to tuberculous infection, Pub. Health Reports 56:1082, 1941.

7. Furcolow, M. L., Hewell, B., and Nelson, W. E.: Quantitative studies of the tuberculin reaction. III. Tuberculin sensitivity in relation to active tuberculosis, Amer. Rev. Tuberc. 45:504, 1942.

Testing for Tuberculosis in Kentucky

L. E. Smith, M.D.†

Louisville, Kentucky

THE main purpose of any tuberculosis-control program is to find tuberculosis at the least possible expense and at the earliest possible moment—at a time when something can be done about it. In looking for tools to work with, we in Kentucky have found the tuberculin test and the X-ray very useful.

I am reminded of a story of an old farmer in Kentucky. He was listening to an auctioneer who was emphasizing the plumpness, the healthful looking combs, the beautiful brushes, the feather markings, etc., of some wonderful pedigreed hens that had been put up for auction. Finally the auctioneer shouted, "How much am I bid for these wonderful hens? Bid up, men, bid up!" At this juncture the old farmer took a wheat straw out of his mouth and called out in his strong hog-calling voice, "Hey, mister, you've told us about the ancestors, you've told us about the feathers, you've told us about the combs and the brushes, but you ain't told us the thing we want to know most. What we want to know about them hens is—do they lay?"

We all agree that this is a very pertinent question regarding hens, and that is what the folks in Kentucky wanted to know about this new method of tuberculin testing and X-raying when it was first popularized some years ago. They wanted to know, "does it lay?"

In 1930, when I became Executive Secretary of the Kentucky Tuberculosis Association, the people of Kentucky were not using the tuberculin test. They had the idea, in a general way, that "everybody has a little tuberculosis." Therefore, the idea was not to see whether tubercle germs had entered the bodies of our people, but simply to find out how much tuberculosis they had, where it was located, and what condition the person was in.

For two years I was health officer of Breathitt, which is in the Kentucky mountains, and I was in pretty close contact with the health officers throughout the state, as well as many physicians. The general opinion that there was very little you could do about tuberculosis unless you had complete sanatorium facilities prevailed pretty widely in our state.

In June, 1931, as executive secretary of the Kentucky Tuberculosis Association I attended my first Annual Meeting at Syracuse, New York. There, I heard the wonderful story about the control of bovine tuberculosis, and I was struck by the fact that the tuberculin test was the powerful weapon used in this gigantic tuberculosis control program in cattle. I felt the reasoning was clear and the logic flawless when it was said that tuberculin would do the same thing for people as it had done for cattle, if properly used.

I went back to Kentucky thinking about it. I looked at the other measures of tuberculosis control that had come along previously and none of them had laid any eggs in Kentucky; the nest was still empty.

The case reporting was so poor that the records for 1929 showed only 985 tuberculosis cases reported for the entire state and 773 of these had been reported from Jefferson county alone, leaving 212 cases reported from all 119 other counties in the state of Kentucky. In that same year of 1929 statistics showed that we buried 2,656 persons with tuberculosis—and only 985 cases reported! Our death rate that year was 103.9 per 100,000.

Well, we got busy. A lot of folks said we could not do much about it, and they said people would not be stuck by a needle but, I said, "We have been sticking them for typhoid, diphtheria and smallpox, and we will stick them for tuberculosis." I had been working in Breathitt county, and those of you who know the reputation of that county will understand why it is not wise to try to force them to do things, and as you may know, at that time, more people died of lead poisoning in Breathitt county than of tuberculosis. But there is always a way, so I started out to talk Kentucky into a tuberculin testing program. It was not easy, but I had six sisters at home and had married into five more, so in self defense, I learned to out-talk eleven women. Anyone who can do that should be able to talk folks into a tuberculin testing program. We did talk them into it. The first year there were more than 1,600 officially recorded tuberculin tests and, perhaps, a couple of thousand reactors X-rayed.

Here, again, we ran up against a problem, because the commercial prices for roentgenographs were high—anywhere from $10 to $25—and there were only a few scattered roentgen men outside of the large cities. But, to make a long story short, we worked, we talked, we showed pictures, and we did about everything else, and now to scan a period of ten years, we find that in 1940 there were approximately 72,000 tuberculin tests recorded and some 10,000 X-rays taken by our two field portable X-ray units that have been working across the state. In many instances the local roentgenologists have made special prices for those on the lower economic level, and now many of them are making roentgenographs for $2.50 per picture, and some for as low as $1.25 for those who are not able to pay the commercial price.

We now have a law in the state compelling teachers, bus drivers, janitors, etc., to prove themselves free from infectious tuberculosis before they can be legally employed in our state. *We believe in the tuberculin test and the roentgen ray for reactors. We believe the tuberculin test is more than a case finding procedure and that it also has a great educational value.* We are doing it now in Kentucky on school employees, food handlers, NYA, WPA, and many other groups. We are doing it in many of our pre-natal clinics, and are picking up expectant mothers with tuberculosis before the baby comes. The pediatricians in the state are awakening to its importance and it is being widely used by them in office practice. The fact is, due to the educational programs in the schools, parent-teacher associations, etc., mothers have demanded it of their physicians. We believe in it and we are going to continue to use it, because, as we go back over the period of ten years, we see that from practically no interest at all, there has developed a great interest in this program. We see a death rate that has come from 103.9 per 100,000 to 68.2. We see, instead of fear of tuberculosis, an understanding of it and a determination to conquer it. It is true, that we are using tuberculin testing a little more discreetly now than we did a few years ago, because we are confining the measures to contacts, mass workers, preschool children, the lower grades, and the high school groups. But we are using it, and we are going to keep using it. We are using the old tuberculin, and as we do so, we find it quite satisfactory for a practical tuberculosis control program.

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†Executive secretary, Kentucky Tuberculosis Association.

To answer the question the old farmer asked of the auctioneer, we say "Yes" when we remember the emptiness of the tuberculosis control program and compare it to what is going on today. We in Kentucky know that this tuberculin testing and X-ray hen lays in Kentucky, and we are going to keep right on with this splendid program.

The Significance of the Tuberculin Test

L. L. Collins, M.D.†
Ottawa, Illinois

THE importance of the tuberculin test as an aid in diagnosis must not be overlooked. Of 7,000 patients with tuberculosis who were tuberculin tested at the Municipal Tuberculosis Sanitarium in Chicago, not one failed to react to tuberculin in dosages up to 1 mg. Douglas, Long, Ordway, Bryan, Slater, and many others have found the tuberculin test to be equally reliable in detecting the presence of tuberculous infection. One author states that it is one of the most dependable of all our biological tests. Furthermore, it has a negative value which equals its positive value in diagnosis. A patient who fails to react to tuberculin in dosage up to 1 mg. should not be considered as having pulmonary tuberculosis unless a confirmed and repeated positive sputum can be obtained. Thus we can conclude that for practical purposes a negative tuberculin test indicates no active pulmonary tuberculosis. Too many patients have been subjected to unnecessary and unjust interruption of their normal lives and have suffered great economic loss because a diagnosis of pulmonary tuberculosis was made which would not have occurred if the tuberculin test had been used. To make matters worse, undoubedly, many patients have received their primary infection at a sanatorium, to which they had been sent with a mistaken diagnosis of tuberculosis. We have several patients to whom we believe this happened. A tuberculin test originally might have prevented these tragedies.

Further, the tuberculin test is the only accurate method we have to determine the incidence of tuberculous infection in a group or a community. For example, we found that 85 per cent of the tuberculin reactors in the high school population of La Salle county had no known contact with tuberculous persons. It was only by being tuberculin tested that these students discovered that they had been infected with tubercle bacilli and, therefore, should be examined at least annually.

Of course, on the other hand, the fact that a patient has been in contact with open pulmonary tuberculosis is not sufficient evidence to conclude that infection with tubercle bacilli has occurred. Quite often such a contact fails to react to tuberculin, indicating that infection did not take place. Again, tuberculin's negative value becomes apparent.

The educational significance of the tuberculin test is very important for tuberculosis control, and this fact must not be overlooked by those concerned about control of this disease. The test is simple, painless, and easily understood by the public, particularly the rural population who have gained a familiarity with it through tuberculin testing of cattle. The reaction, when present, is definite and its significance is readily understood by the patients. The information obtained is valuable to the patient and his doctor. It has been our experience that persons who react to tuberculin become interested in tuberculosis and eagerly wish to learn all they can about the malady. They are usually surprised to learn that they are already infected with tubercle bacilli and can, therefore, develop clinical disease.

Tuberculin testing surveys create public interest in tuberculosis and tend to make both doctors and public more tuberculosis-minded. Good newspaper publicity can usually be obtained. For some time following tuberculin testing surveys, a larger number of persons request examination and consequently, many cases of active tuberculosis are discovered before illness occurs or the disease becomes contagious.

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†Superintendent, La Salle County Sanatorium.

The tuberculin testing surveys in La Salle and De Kalb counties are conducted primarily for their educational value. They furnish an opportunity to discuss with the students and the public the fundamental facts about tuberculosis which everyone should know. The student who reacts to tuberculin is told he has living tubercle bacilli in his body and should, therefore, have an X-ray picture of his chest at least once each year.

The student who does not react to tuberculin is told he has no living tubercle bacilli in his body but should be re-tested each year because tuberculosis is a contagious disease, and he might become infected in the future.

We have several cases that have reacted to tuberculin on subsequent tests who were non-reactors when first tested. In two cases the source of infection was discovered.

Letters are sent to the parents of each student tested, explaining the result of the test and the procedure that should be followed. Copies of these letters are sent to the family physician designated by the student.

Often, when a tuberculin reaction has been discovered in a student, other members of the family go to the physician to be tested. Several cases of active tuberculosis have been found due to these family examinations.

Practicing physicians do the tuberculin testing in the surveys. They are in this way made acquainted with the dosage, technic, and various types of reactions. Usually, this is followed by routine testing of their private patients. A large number of unsuspected cases of active tuberculosis have been discovered much earlier than usual because of this procedure.

Some tuberculosis workers during the past few years have abandoned the tuberculin test and depend entirely upon the roentgenograph for case-finding. The small roentgen film, which has considerable merit, and the lack of confidence in the reliability of the tuberculin test are largely responsible for this change.

Dr. Myers and others have shown conclusively that it is impossible to make an accurate diagnosis only from shadows on a roentgen film. The roentgen conferences held each year at this convention offer further evidence toward the proof of the difficulties encountered and the mistakes made when one tries to diagnose tuberculosis from a roentgen film alone. When we abandon the tuberculin test we sacrifice much tuberculosis education.

The tuberculin test remains the simplest and yet the most important part of the tuberculosis program. It offers the most satisfactory and effective method of obtaining the interest and coöperation of the family physician. This interest and coöperation are essential to every successful case-finding program. Long ago it was said that every doctor's office should be a tuberculosis clinic. The tuberculin test certainly can make this ideal realized.

Today, many communities are using the tuberculin test to educate the public about tuberculosis and to maintain the interest and coöperation of the family physician. These communities report the finding of a higher percentage of cases of early tuberculosis and lower tuberculosis death rates than those communities which do not use this method.

The tuberculin test was the most important single factor in eradicating tuberculosis from cattle. It can be just as important in eradicating tuberculosis from the human family.

Education About Tuberculosis in the 'Teen Age Group

An Educational Project in the Kanawha County Schools

Leo H. Mynes, M.D., F.A.P.H.A.[†]
Charleston, West Virginia

WE have sought to find a more efficient program in our Kanawha County Schools for teaching about tuberculosis. Beginning in 1936 we began tuberculin testing in our public schools. At this time practically all children tested were in the lower grades, with only "suspects" and known contacts from the junior and senior high schools. This year, 1942, we have exactly reversed the age group tested, confining our work to the secondary schools. We decided to do this after fruitlessly examining hundreds of X-rays of positive children of the age from 6 to 12.

We now believe, and possibly our opinion is shared by others, that children of this latter age are relatively free from the secondary or adult type of tuberculosis. We found numerous cases of evidence of past infection of the primary type, as exemplified by the Ghon complex. These children had apparently made a spontaneous recovery, without any history of tuberculosis infection ever having been diagnosed.

The picture changes, however, in the adolescent boy or girl, particularly in the girl, when tuberculosis, usually a secondary type, is a serious disease and early diagnosis is highly important for successful treatment. The purpose of our program is to teach indelibly that tuberculosis is a germ-caused disease, that it is transmitted by contact, and that early signs and symptoms are often obscure or absent. We teach in addition that there are at least two definite, exact scientific means for its early

[†] Medical director, Kanawha County Schools, and president, West Virginia Tuberculosis and Health association.

diagnosis, namely the tuberculin test and the X-ray, and that such cases diagnosed in the minimal stage have an excellent chance for recovery, often denied the late cases.

In 1940, in order to get an inventory of just how much our children of the teen age group knew about tuberculosis, we distributed 5700 copies of questions dealing with the cause, nature, diagnosis, prognosis, and best type of treatment. These questions were essentially those originated and used in a Gallup Survey several years ago. The results of these tests were astonishing in regard to the lack of information these children had about tuberculosis, and the amount of misinformation they had about the same disease. Less than 50 per cent knew it is an infectious disease, but gave as its cause, smoking, drinking, and staying up late at night. Thirty per cent believed it to be inherited. A large number thought removal to another climate and altitude an absolute essential to getting well.

As these students presumably came from the better informed homes in each community and in most instances their thought reflected the minds of their parents on this subject, we thought it proper to try to correct this condition in both the homes and in the schools.

THE FIELD

Our county (Kanawha) unit of schools offered a good testing ground. We have approximately 50,000 school children of all ages. There are 32 junior and senior high schools with a population of 15,857, and of this number 9,839 were available for study and educational work. These schools are situated in urban, rural, residential, industrial, mining, and oil producing communities. The negro population is less than 10 per cent. There are no foreign language speaking colonies. The vast majority of students are of English, Scotch, or Irish descent. The economic conditions are probably considerably above the average of the country as a whole.

We begin our campaign by showing talking movies to the school groups. The two most effective have been "Behind the Shadows" and "Let My People Live." These and many others are furnished by the state tuberculosis association and are available at any time from the National Tuberculosis Association. Posters, both the lithographed type and those made by students were placed in the schools. Some years we have competitive essays. The nurse then makes talks to groups and later invites sensible questions for discussion. This is the build-up for getting the children to take the tuberculin test. This test is never made compulsory; nor do we require the parents' consent for giving it. We assume that when a child reaches the teen age, he or she is old enough to make decisions and assume responsibilities for himself.

The tuberculin test is offered to all incoming students who have not previously had it. It is given to those who have been previously non-reactors. It is not repeated on the previous reactors, who instead are urged to be roentgenographed annually. We are using Old Tuberculin, made up in dilution of 0.1 milligram to 1/10 cc. solution at one of our state hospitals. We prefer it because it is economical, easy to give, and we believe the results to be reliable which in our hands have been most satisfactory. We give only one injection, the 0.1 milligram dose. Occasionally we get a fairly intense reaction but in over 20,000 tests none has been severe enough to cause concern.

We have found that students are willing to take the test if they are first convinced of its value, and next if they are assured that it will be given quickly. They do not seem to dread the injection nearly as much as the period of anticipation while they are waiting for it. Only after all preparations have been made are the children brought to the testing room. They form a line. The forearm is prepared with alcohol by their classmates, usually the prettiest or most popular girls in the class. The testing team is made up of the school physician and two nurses. One nurse boils the syringes (at least 10) and the needles, using the "vim" Forsbeck needle racks, each of which holds 31 needles. This nurse also fills empty syringes. The second nurse gives her time to changing the needles as they are used after each injection, placing the syringe with sterilized needle directly under the physician's right hand. The physician picks up the syringe with right hand, steadies it with the left and presses the piston down after the needle is inserted, with the left thumb. This two-handed hold on the syringe gives a positive control over it and enables one to give an accurate dose, which is measured by the size of the wheal rather than by the graduation marks on the syringe. The student seats himself on a chair at the end of a table, extending his arm along the edge at a comfortable level. Everything being in readiness, the injection is given quickly and he is on his way sometimes before he realizes he has had the test. We try to keep the line in constant but slow motion all the time. This technic permits giving over 200 tests per hour without undue strain on the testing team. We have found that students tested in this manner are usually in high good humor, joking and laughing, and that fear and hesitancy are practically absent.

It is in the reading of the test that we get our message home to the parents. At the time of reading, we provide the student with a printed sheet of paper, of distinctive color, which he gets just before he comes to the reading room. This page has a space for the child's name, age, grade and school. It also has a space for the parent's name, address, and the name and address of the family physician. Below this are two blank spaces headed "Positive" and "Negative." All of the blank spaces are filled in by the student before he comes to the reading. The reading is made by the physician and a nurse records the finding, grading the positives as one, two, three or four. Below the above information are two paragraphs, the first being headed: "If your reaction is positive it means ——" . . . then follows a simple, one-syllabled explanation of the reaction, with the urging that an X-ray be made. The other paragraph is headed: "If your reaction is negative it means ——" . . . with an explanation of a negative reaction. This paragraph ends with the words "better be tested ten times than be sorry once." The readings are made at the end of seventy-two hours in order to eliminate false positives. These papers are to go home but not until the information at the top of the page has been copied off for the records. Our purpose in making out an individual sheet for each child is psychological. If we sent literature about the tuberculin test home, or any literature for that matter, in our experience, it seldom arrives there or if it does is tossed aside. By the system we have described, however, we arouse the curiosity of the child and of his parents. They want to know what we did to their child and why? What will happen to his arm and what does it mean, particularly if the reaction is positive? While they are in an inquisitive mood for information we give it to them both by the record sheet and by any other literature we have to distribute. We know that this literature is read, because when younger children from these families reach high or junior high school entrance, the parents, in many instances request that the child be tested and roentgenographed if positive.

Roentgenographing the Positive Reactors

After the reading we have the positive reactors for a short talk to reassure them, and to urge that they have an X-ray made at the earliest opportunity. We provide this opportunity by engaging a commercial mobile X-ray unit which visits the schools and sets up its apparatus in the gymnasiums. The roentgenograms are made on a roll of sensitized paper. This method has the advantage of dependability, economy and speed, as a hundred films can be made in an hour if the students are prepared. They are processed for reading by the company who returns them to our community where a well known roentgenologist, whose opinion is highly respected by our physicians, makes the interpretation and writes out the report. The report is fastened to the film and it is returned to the student if it is negaive. If positive the X-ray is taken to the child's home and the parents are advised of the condition found and urged to have further examinations made by the family physician or a chest specialist. The total cost of the X-ray to the student is one dollar. Most students pay this. Some charges are paid for by the Department of Public Assistance, some by the Anti-tuberculosis League; these two agencies incidentally use this method of checking up on their known contacts, both adults and small children. Some schools have a health club, each student who takes the test and the known positive reactors each contribute twenty-five cents. As the total number of positive reactors is seldom over 25 per cent there is enough to pay for all the X-rays needed.

The Follow-Up

All cases who show any lung pathology in this survey are visited by the full-time nurse provided for by the Anti-tuberculosis League. We are fortunate in having a splendidly equipped 45-bed hospital for children, operated by the League where we can immediately hospitalize any of our cases and follow them through the cure back to their homes by the League's nurse or by one of the school staff nurses.

In the past seven years we find from the record that we have given 20,587 Mantoux tests. The average positive percentage of white students is 17.4. The negro students average 26 per cent positive.

In one small rural high school at the beginning of our program we found 85 per cent of the students positive. This had followed exposure to a senior who was discovered to have had advanced tuberculosis with cavitation. In the intervening years we have checked this school very carefully and now find the incidence below the average in positive reactors. A total of 5,013 roentgenograms have been made by the mobile unit. This number includes 600 teachers who have volunteered for examination. The average annual "find" of active cases of secondary type tuberculosis is five. All of these have been classed as minimal except two. One, a captain of the football squad, had moderately advanced bilateral apical tuberculosis. He made an uneventful recovery. The other, a healthy appearing robust girl, had a cavity over 2 centimeters in diameter. To our knowledge no student in whom we made the diagnosis has died, although several are still under treatment.

Conclusion

We feel that a campaign of this type has some merit. We annually pick up silent cases of active tuberculosis and thus possibly save lives. Because the students "live" through these experiences by actual participation in them we feel that they will be more likely to remember them and utilize them in later life than if tuberculosis education was presented to them in an academic fashion. We feel too that because of their school experience that the element of fear will be lessened. This element is a very definite handicap in that many people with tuberculosis are afraid of a roentgenogram and of a diagnosis and evade one as long as possible, often indeed until what might have been a curable case of tuberculosis becomes incurable.

We feel that in teaching the high school boy and girl of today, we are educating the parents and the leaders of the community of tomorrow, and since health is the most valuable thing we can teach, a sound health program is well worth what it costs.

Summary of a Ten-Year Mantoux Program in Rural Minnesota

L. S. Jordan, M.D.[†]
Granite Falls, Minnesota

THE decrease in the incident of reactors to the Mantoux test, using 1:1,000 of Koch's O. T., in both rural and town schools in the Riverside Sanatorium district of rural Minnesota, has been striking as observed over the period of the last ten years.

The counties comprising the Riverside Sanatorium district are Yellow Medicine, Renville, Chippewa, and Lac qui Parle, with an area of approximately 3,240 square miles, located in the south central and western portions of Minnesota.

The rural and town school surveys were commenced in 1930 and have been continued periodically ever since. The same technic and the same strain of Saranac Lake O. T. has been used. A total of some 32,000 school children have been tested over this period of ten years, repeating the tests in the same communities, children from the same homes, and under similar conditions each time. Only the totals are given in this report of those schools which we have rechecked routinely during this period of observation.

Of the total of 12,801 children routinely tested in ten years, summarized in this report, 8.9 per cent were found to react to the O. T., 1:1,000, over the whole period of time. The scale used in judging a positive reaction was the National Tuberculosis Association Standard. The schools listed below show the indicated amount of drop in percentage of reactors, and the first and last year in which they have been tested.

Results Obtained in Mantoux School Surveys in Riverside Sanatorium District, Granite Falls, Minnesota

School	Year Tested	Per Cent Positive	Total Enrollment	Number Tested
Wood Lake	1930	8.6	167	149
	1940	5.7	194	181
Montevideo	1934	13.6	822	784
	1940	7.4	843	791
Renville	1934	7.4	502	424
	1940	4.3	493	472
Yellow Medicine County	1935	8.2	1665	1019
66 Rural Schools	1940	1.9	1194	967
Rosen (Parochial)	1937	8.8	90	90
	1940	2.5	86	86
Echo	1931	10.8	125	111
	1937	3.7	185	132
	1940	2.1	223	190
Granite Falls	1931	9.33	571	428
	1940	6.7	710	553
Hanley Falls	1932	11.7	126	94
	1940	.7	160	131
Marietta	1931	17.9	162	129
	1937	12.5	246	184
	1940	7.5	192	153
Bellingham	1935	7.5	173	147
	1940	4.7	210	167
Clarkfield	1933	9.6	440	307
	1940	3.07	500	423
Buffalo Lake	1931	12.8	190	140
	1941	6.7	280	226
Sacred Heart	1933	21.2	236	185
	1941	5.9	225	167
Olivia	1934	11.5	391	339
	1941	4.1	400	338
Bird Island	1932	25.7	165	145
	1941	7.1	200	181
Morton	1934	13.6	279	176
	1941	3.1	298	229
Franklin	1934	12.2	190	90
	1941	2.8	200	178
Boyd	1931	15.6	155	118
	1941	3.5	200	170
Fairfax	1934	21.3	270	183
	1941	1.3	280	226
Bird Island Parochial	1934	19.4	247	118
	1941	5.8	240	221
Olivia Parochial	1934	14.4	128	90
	1941	3.1	120	97
Fairfax Parochial	1934	6.9	148	72
	1941	2.2	114	94
Clara City Parochial	1934	30.5	60	59
	1942	0.0	78	78
Clara City Public	1934	11.6	220	158
	1942	6.8	245	197
Milan	1930	18.6	185	161
	1940	1.9	278	253

The foregoing schools were picked from 212 schools tested in our district to show the greatest interval of time for accurate comparison. The total decrease in percentage in all schools tested is shown by the following comparison:

Percentage of positive reactors, first test.......13.9
Percentage of positive reactors, last test....... 4.0

This is a 65.3 per cent reduction in the incident of reactors. We attribute this drop in the percentage of reactors to the following factors:

1. Educational, in order to gain coöperation.
   - (a) Talks to schools, parent-teacher organizations, Farm Bureau groups, civic bodies, and school boards.
   - (b) Demonstrations and literature to both parents and pupils in every school.
2. Follow-up Field Nurse Service.
   - (a) Roentgenographs of chests of all positive reactors.
   - (b) Careful investigations of home conditions and chest roentgenographs of any suspects or other suspected contacts.
   - (c) A careful history of any possible contacts that may have been broken previous to our entry into the field.

[†] Superintendent, Riverside Sanatorium.

3. Follow-up of all reactors in from three months to a year with a second X-ray. Advise of yearly X-ray check-up of all reactors.
4. Break all contacts with a known case of pulmonary tuberculosis by admitting open case to the sanatorium whenever possible, where control can be instituted. If this is not possible, to place any children or young adults in another home away from possible contact with the open case. Instructions to prevent spread of disease.
5. Stress the importance of the cattle testing program, and see that it is religiously followed through.

As has been shown, our rural schools in five years have dropped from 8.2 per cent reactors to 1.9 per cent. This is for the whole group of 66 schools in one county, in which 1,686 children were tested. In the school of our largest city, with a population of 5,220, the percentage has dropped in six years from 13.6 per cent to 7.4 per cent. The difference in the drop in percentage may be attributed to the fact that in the cities, it is harder to isolate contacts than it is in rural districts, as the average child's sphere of possibility, insofar as infection is concerned, is manyfold greater in cities or towns than those who live in the country and attend rural schools.

In our 1939-1940 testing program, readings were made at 48-, 72-, and 96-hour intervals. It was found that the 72- and 96-hour readings were identical in every instance, and that there was a definite increase in reactors from the initial 48-hour reading. It would seem from this, that the ideal time to read Mantoux tests is between 72 and 96 hours after the test is administered. In this way we get more accurate readings on the so-called "delayed reactors," who have been a source of annoyance to all of us from time to time. Furthermore, any slight nonspecific reactions will have disappeared.

One thing must be kept in mind: that most of our active cases of pulmonary tuberculosis in years to come are going to develop from the group of school children that have a tuberculin reaction today. That is the group to watch. Find the disease early—in its curable stage. Trace the source and prevent further infection.

Special emphasis has been given throughout this period of time to testing and X-raying teachers, janitors, and employees of schools, who are occasionally found to be another source of infection.

In testing some 212 schools, we have tested 1,164 teachers, of whom 30.4 per cent reacted to 1:1,000 dilution of old tuberculin. These were all X-rayed. The findings were as follows:

Demonstrable pulmonary lesions by X-ray which proved to be tuberculous	14
Positive sputum for tubercle bacilli	9

From this we see that we do have open cases of pulmonary tuberculosis among teachers and school employees spreading infection daily, who are being missed if our Mantoux tests are not made to include all school personnel.

We have been able to secure fullest coöperation in this work by impressing the importance of safeguarding the pupils' health on our various school boards and parent-teacher associations. As to the legality of compulsory testing of teachers and other school employees, our Minnesota attorney general has ruled, to quote: "Mantoux skin test for teachers is a reasonable exercise of the police powers of the school boards, if required for the purpose of safeguarding the health of the pupils of public schools."

The Mantoux once being done, all reactors are X-rayed. If no evidence of active pulmonary tuberculosis is seen, the teacher is given a statement to that effect, which is filed with the employing school board. All teachers who are non-reactors are retested each two years. All reactors are X-rayed each year.

Considering the simplicity of repeated Mantoux testing in searching out those who are already infected, let no one stand blameworthy by procrastination. Let us include our teachers and school employees everywhere in this testing. As to school children when found positive, let us check them routinely with roentgenographs annually. For the first several rechecks, a six months period is advisable when possible. For example—in April, 1940, we tested a small high school of 60 students, 5 of whom were found to react to 1:1,000 dilution of old tuberculin. Of these 5 who were found to react, 4 were X-rayed. One, through his own choice, was not. At that time he, the one who was not X-rayed, was a freshman in high school. In April, 1942, the same school was retested, there being now 62 in high school. Of these, 51 were found to react—a startling increase. This time, the boy who had reacted positive previously and had not been roentgenographed, was acutely ill. A film was obtained of him, and he was found to be a far-advanced case of pulmonary tuberculosis, with sputum teeming with tubercle bacilli. He is now in a sanatorium.

Can there be any question but what the tremendous increase in tuberculin reactors was due to him? Can there be any question but what he would have been suspected, if not picked up, as an active case of tuberculosis two years ago—if he had been roentgenographed—and the infection of the majority of the high school would have been prevented!

We have the tools in our hands to prevent the spread of the tubercle bacilli in the Mantoux test and the X-ray. We feel that, if these are used where the transient case of tuberculosis is not a problem, tuberculosis in the future will become as rare a destroyer of life and health as diphtheria, typhoid, and small-pox are today.

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MINNEAPOLIS, MINNESOTA, OCTOBER, 1942

CUTANEOUS TESTING IN ALLERGY

Hay fever has been as prevalent as ever—a reminder that this allergic disease along with others has not been satisfactorily controlled. Clinical observers have felt that until the underlying cause or causes of allergy are established, an accurate determination of the offending allergens offers the best lead for effective treatment. How are these allergens found? A careful history of the illness may give adequate information. However, in the majority of the cases cutaneous testing is more satisfactory. Many physicians may find it hard to agree with this statement. Some condemn skin-testing. This attitude is unfortunate but it can be explained easily when the methods employed in testing are investigated.

The allergenic protein extracts always should be fresh and carefully preserved. The number used should be sufficient to include common foods and inhalants. Too often only a few allergens are applied and the offending substances are excluded. The method of application must vary. Some patients require a deep penetration of the allergenic extract for the best results. In other cases, the skin is extremely sensitive and too much trauma will yield many falsely positive tests. Most important, however, is the interpretation of the reactions. A small area of erythema in one patient may be as significant as a large wheal in another case. Therefore, it is essential that the physician should apply and read all skin tests and not pass this procedure off to the office nurse or assistant. If this were done, there would be less criticism of the cutaneous testing method in the diagnosis of allergic disease.

A. V. S.

GUILLOTIN, GATLING, AND ROCKWELL

The fact that the names of three physicians are historically identified with death-dealing devices might easily give rise to a wrong impression. They were all humane men and fully entitled to membership in a profession whose traditional object is the prolonging of life and the mitigation of suffering. Indeed it is the last named attribute which stimulated their interest in the devices mentioned.

Joseph Ignace Guillotin was a highly respected practitioner of medicine at the time of the French Revolution. He deplored the clumsiness and inefficiency of the gibbet and was instrumental in having the decapitating appliance which was later given his name substituted. He never had anything to do with its invention or improvement. Its original use is ascribed to the Persians; after the 13th century it was used in Italy, where members of the nobility who were condemned to death had the privilege of choosing it as a method of execution if they preferred it to more plebeian technic. The Germans used it in the Middle Ages, we are told, and in Scotland a similar device was employed with the euphemistic title of "maiden" in the 18th century. So Dr. Guillotin merely was the champion of what he believed to be the most merciful way of inflicting the death penalty, by an old established and well tried method.

Richard Jordan Gatling, M.D., received his degree from the Ohio Medical College in 1850 but never practiced. He was a mechanical genius and turned his talents to useful inventions among which were a steam plow and a hemp breaking machine. Shocked by the inconclusiveness of the warfare of his day he conceived the idea of producing a weapon so deadly that it would speedily bring organized combat to an end. Thus he invented the revolving, rapid fire gun which bore his name; the crude forerunner of the modern machine gun, deadliest of all weapons. Gatling died in 1903 at the age of 85, happy in the thought that he had brought lasting benefit to humanity.

A. D. Rockwell, M.D., was a pioneer in electrotherapeutics, to the literature of which he made many important contributions. When the State of New York officially adopted electrocution for capital punishment it was Rockwell who was employed to apply his knowledge and ability to make it quickly and painlessly effective. The "electric chair" of today is practically as he perfected it. As in the other instances he was actuated by only the best of humane motives.

G. C.

AFTER THE WAR — WHAT? *

As a nation we are beginning to appreciate the tremendous cost of the wishful thinking, wilful blindness and inexcusable ignorance of world affairs which resulted in our unpreparedness to meet what was plainly inevitable. As a profession we should profit by that experience and make sure that we know what is happening or is about to happen to us.

Society is an organism subject to all the laws of evolution. Medicine is an organ of vital importance in that organism. There is of necessity a constant interrelationship between the two, and we can not appraise our situation apart from that of society as a whole.

We must be aware that the World Revolution is not a revolution in the ordinary sense but a world-wide change as fundamental as that from feudalism to capitalism. Furthermore, we must accept this change as inevitable and very imminent. In fact it is already here. Its groundswell has been rolling toward us for many years, but it is only now when the wave has broken on our own shores that we are aware of its strength.

The "New Order" of the Nazis and Japs is only one manifestation of the change. The Russian experiment, the Swedish "Middle Way" and the American New Deal are all equally symptomatic of a new way of life.

It is with this background that we must consider what is ahead of us. We are paddling our canoe down a river with many bends and the current is running faster and faster. To drift blindly may lead to disaster. We cannot turn back, but we can stop paddling long enough to climb to some high point and see what is before us. If we can rise far enough we may get a bird's-eye view. What would it show us?

Of course our nearest view would be that of the greatest nation on earth hamstrung during the critical prewar years by the myopia of its leaders, preparing terribly late to give its life blood to escape slavery. The wider view would be that of a world at war. But under the smoke and fire of battles we might see all the peoples of the world moving like a tidal wave in one direction. That direction is toward a new form of society in which independence is replaced by dependence and freedom traded for security. The leaders who promise these are the ones the people follow. The security they seek and demand is security against want, hardship and illness. That is the negative way of saying that they demand assurance of shelter, food, clothing, recreation and medical care without much regard to their ability to earn them.

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*From the address of George W. Cottis, M.D., president of the Medical Society of the State of New York, at the meeting of the First District, October 7, 1942.

Book Reviews

Diseases and Injuries of the Larynx, *a Textbook for Students and Practitioners,* by Chevalier Jackson, M.D., Sc.D., L.L.D., F.A.C.S., and Chevalier Jackson, A.B., M.D., M.Sc.(Med.), F.A.C.S. 592 pages, with over 200 illustrations, including 11 plates in color; cloth. New York: The Macmillan Co., 1942.

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The latest edition of the Jacksons' book on the larynx is typical of their publications, in that it is based upon their tremendous clinical experience. Some other authorities may not agree with all the opinions of the Jacksons, for example, p. 115, "Freshly ground horseradish will clear out the sinuses better than any other known substance, taken by mouth, and will usually obviate the use of intranasal applications." Also p. 300, "When a child has had one attack of croup the household should never be without a tank of oxygen thereafter." No mention is made of chemotherapy in the wound, following laryngectomy. This has been a great help to other laryngologists as it materially shortens the postoperative convalescence.

The chapter on war injuries is based on the authors' experience in industrial and accident surgery.

The book is full of practical information and belongs in the library of all laryngologists. K. A. P.

News Items

Dr. R. G. White has been named Director of Maternal and Child Hygiene for the State Department of Health according to Dr. Frank J. Hill, acting state health officer. The appointment became effective September 15, 1942. Dr. Viola Russell, who has been director of Maternal and Child Hygiene since January 1, 1940, has resigned to accept the position of Director of Maternal and Child Hygiene for the Vermont State Department of Health.

Dr. R. C. Webb, Minneapolis, read a paper, "Injuries to the Abdomen," as a part of a symposium on civilian and industrial accidents which occupied the afternoon session of the annual meeting of the Southern Minnesota Medical Association held at Rochester, Minnesota, September 28th.

Dr. E. A. Canterbury of Grand Forks, North Dakota, has been ordered to duty in the Army medical corps at the medical replacement center at Camp Barkeley, Texas. He had practiced in Grand Forks since July, 1941.

Dr. E. V. Allen, chief of a section in medicine at the Mayo Clinic, has been commissioned a lieutenant colonel in the U. S. Army medical corps.

Dr. William R. Bagley, Duluth, has been appointed a member of the Nopeming sanatorium commission. He succeeds Dr. S. H. Boyer, Jr., who has entered the Army. The appointment was made by the St. Louis county board.

Dr. Thomas J. Dry of Rochester is now a major in the Army medical corps, and is at the station hospital, Camp Carson, Colorado Springs, Colo.

Dr. O. D. Sarff is re-establishing his practice in Virginia, Minnesota.

Dr. J. C. Klein of Shakopee, Minnesota, has been commissioned a lieutenant in the U. S. Navy. He reported for duty at Mare Island, San Francisco, Oct. 16.

Dr. Flurry D. Healy, formerly of Butte, Montana, and recently of the U. S. Army medical corps, has been promoted from lieutenant to captain. He is at Camp Grant, Illinois.

Dr. E. M. Watson, county health officer for the past three years and a practicing physician in Fargo, North Dakota, since 1921, has been named city health officer. He succeeds Dr. E. L. Sederlin, who resigned recently to become regional health officer at Valley City. H. C. Corrigan, city commissioner of health, announced that the city, county and Fargo board of education are considering the establishment of a county health unit, under a program advocated by the state board of health.

Dr. Magnus C. Petersen has been appointed superintendent of the Rochester state hospital by Carl Swanson, state director of public institutions. Dr. Petersen has been superintendent of the Willmar state hospital for seven years.

Dr. E. E. Zemke, Fairmont, is in Camp Bowie, Texas, where he is a first lieutenant in the Army medical corps.

Dr. John C. Vezina, Mapleton, Minnesota, has been appointed captain in the Minnesota state guard medical corps and assigned to the medical detachment of the third regiment in Mankato.

Dr. J. Nelson Ewbank of Minneapolis is the new assistant superintendent of the Willmar state hospital.

Dr. Frederick P. Arny of Preston, who recently completed his four-year term as Fillmore county coroner, is now at Bowman Field, Louisville, Kentucky, where he is a first lieutenant in the medical corps of the Army air corps.

Dr. Richard D. Weber, Missoula, a member of the Western Montana clinic for the past two years, is now in Las Vegas, Nevada, as a captain in the Army medical corps.

Dr. George M. Ruggles, Forest Lake, Minnesota, has been commissioned a captain in the Army medical corps.

Dr. David T. Berg of Helena, Montana, has been appointed to the state board of health to succeed Dr. L. T. Sussex of Havre.

Dr. H. A. Shaw, Lake Park, Minnesota, has reported for duty with the Army medical corps at Salt Lake City.

Dr. George L. Routledge, Dillon, Montana, is now a lieutenant commander in the Navy. He reported for duty September 10 at the Treasure Island naval hospital, San Francisco.

Dr. L. V. Bergs, physician of Owatonna for the past twelve years, has been commissioned a first lieutenant in the Army medical corps at Fort Snelling.

Dr. R. J. Cairns, formerly of Sanborn, Minnesota, has joined Dr. J. Gordon Cole in the Cole-Cairns clinic, Redwood Falls.

Dr. L. D. Fricks of Seattle, Washington, is the new county health officer of Lewis and Clark counties, Montana, and city health officer of Helena. Dr. Fricks formerly was with the U. S. public health service.

Dr. J. J. Kolars, physician of Le Center, Minnesota, for fourteen years, is retiring from practice because of illness. Dr. R. A. Curtis who has assisted Dr. Kolars for many years will take over the work.

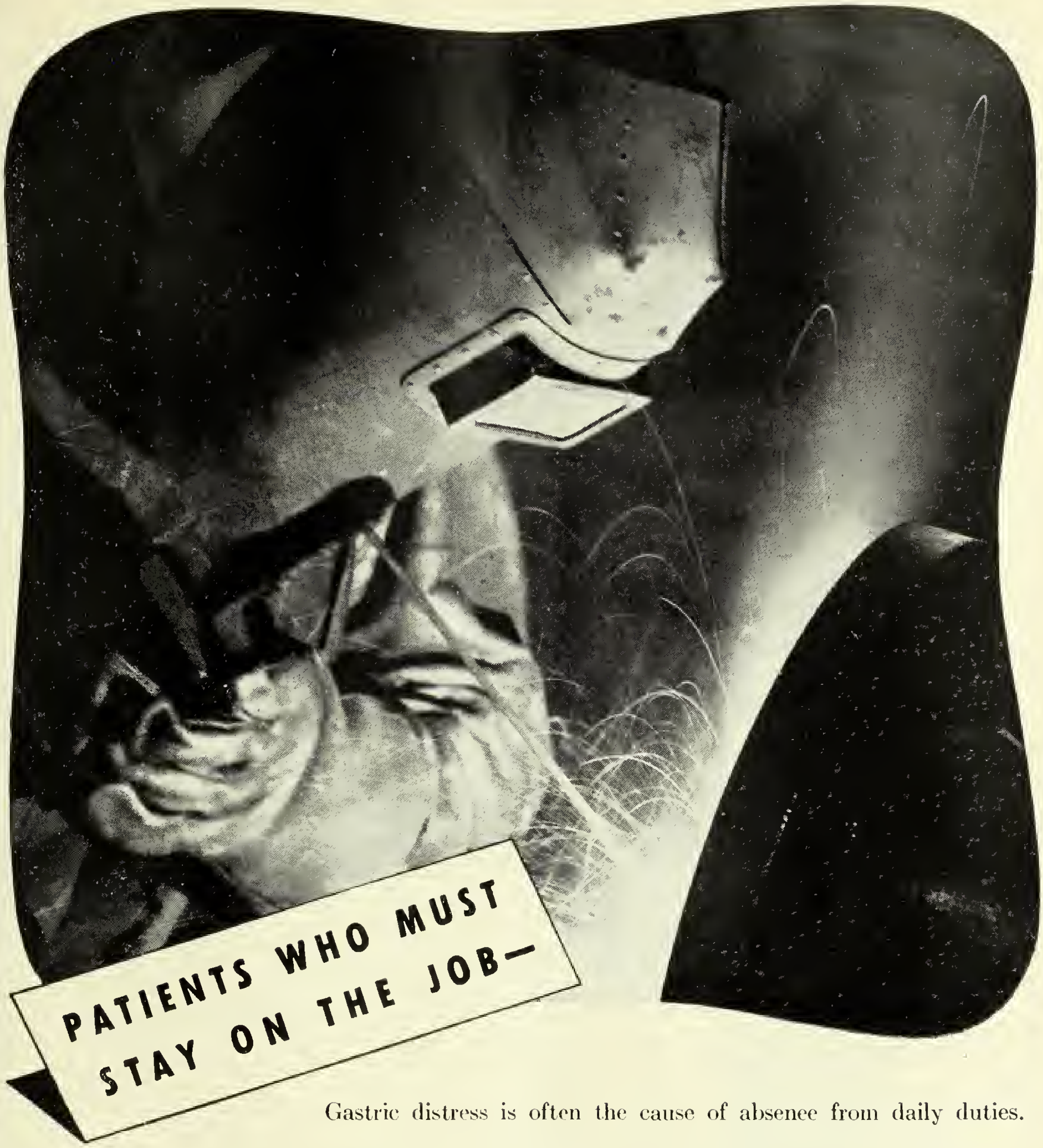
Dr. D. M. Houston, Park Rapids, Minnesota, has begun his active service in the Navy and is stationed at San Diego, California.

Dr. Theodore Stransky, Owatonna, Minnesota, is now in Sioux Falls, South Dakota, in the medical division of the Air Corps Technical school.

Dr. Dan R. Bennett, formerly of Detroit Lakes, Minnesota, has become associated with Dr. Paul L. Greene in Livingston, Montana.

Dr. Franklin Kline, Anoka, Minnesota, has been commissioned a lieutenant in the Army medical corps.

Dr. Clarence Jacobson, Chisholm, was elected president of the Northern Minnesota Medical association at the annual convention held in Bemidji. Dr. R. N. Jones, St. Cloud, was named secretary-treasurer.



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Dr. R. W. Merrill, Morris, Minnesota, has been commissioned a lieutenant in the U. S. Naval Reserve and has reported for duty at the Great Lakes Naval Training Station, Great Lakes, Illinois.

Dr. E. L. Sederlin, Fargo city health officer, has resigned from that position and has gone to Valley City where he is taking charge of a regional health service.

Dr. Robert N. Bowers, chairman of the Lake City (Minnesota) board of health, has joined the medical corps of the Army.

Dr. D. W. Pollard, superintendent of Minneapolis General hospital since 1939, has been commissioned a major in the Army medical corps.

Dr. B. F. Smith, former superintendent of the Rochester State hospital, has been appointed superintendent of the St. Joseph state hospital in Missouri.

Dr. William Fox who has been a resident physician at the San Haven hospital the past year, has become associated with Dr. O. W. Johnson in Rugby, North Dakota.

Dr. Charles J. Beck, who has been associated in medical practice with Dr. A. F. Hammargren at Harvey, North Dakota, for the past year, has been called to active duty with the Army medical corps. Dr. Beck reported to San Luis Obispo, California, on September 11.

Dr. Carl E. Elofson, Fargo physician, has been commissioned a lieutenant commander in the medical corps of the U. S. naval reserve and reported to Bremerton, Washington, October 12.

The Annual Clarence Martin Jackson Lectureship sponsored by the Xi Chapter of the Phi Beta Pi Medical Fraternity will be given at the University of Minnesota, Wednesday evening, October 21, 1942, at 8 P. M. The speaker will be Dr. Thomas Francis, junior professor of epidemiology and chairman of the department of epidemiology school of public health, University of Michigan. Title of his address is: "An Interpretation of the Current Studies in the Control of Influenza."

The third annual medical meeting of the National Foundation for Infantile Paralysis will be held in New York City on December 3 to 4, inclusive.

Seventeen hospitals in 14 Montana counties have installed state board of health incubators for prematurely-born babies. The counties are Cascade, Hill, Chouteau, Toole, Ravalli, Beaverhead, Stillwater, Yellowstone, Phillips, Roosevelt, Dawson, Sheridan, Glacier and Lake. Dr. Edythe P. Hershey, director of maternal and child health, said the board expects soon to have portable incubators available for use by hospitals and in homes when needed in emergencies.

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Vol. LXII, No. 11
New Series

A Consideration of the Clinical and Public Health Aspects of Trichinosis*

Willard H. Wright, Ph.D.†
Bethesda, Maryland

PREVAILING concepts concerning the clinical syndrome of trichinosis seem to be based on the textbook description of the disease, a picture which is encountered infrequently in practice. Much of this information has been handed down from the German literature of the 1860's when interest in the disease was at its height and extensive outbreaks occurred, many of them marked by symptoms of great severity and characterized by a relatively high mortality. Because of changes in methods of packing and distributing pork, severe epidemics of the disease are now of uncommon occurrence and there are more isolated cases exhibiting milder symptoms. For this reason, much of the information which has come down from the early literature is misleading.

The symptomatology of trichinosis is commonly described on the basis of three general stages in the course of the illness, these stages being the periods of invasion, migration, and encystation of the parasite. However, these stages are not necessarily sharply defined and it is confusing to attempt to classify symptoms on this basis. The manifestations of the disease are protean and the severity depends on a number of factors such as the amount of infected meat consumed, the number and condition of the larvae present therein, and probably also the general condition and resistance of the host.

Hall[1] pointed out that trichinosis presents such a varied clinical picture that the disease has been mistaken for over half a hundred other conditions characterized by somewhat the same symptomatology. Even in epidemics involving many individuals infected from the same source, there will be found all gradations in the severity of the disease, ranging from a very mild clinical syndrome with malaise, headache, and slight muscle pain to severe prostration, marked toxemia, high temperature, extensive myalgia, with or without secondary cardiac, pulmonary, vascular, or meningeal complications.

The incubation period of the disease is extremely variable. In persons acquiring a heavy infection, the onset may appear with almost dramatic suddenness in the form of severe gastrointestinal symptoms in twenty-four to forty-eight hours after the ingestion of infected pork. In the absence of such symptoms, most patients begin to show signs of illness from five to fourteen days after infection, although in some instances the incubation period may be as long as three weeks.

For the sake of clarity, it is proposed to discuss various symptoms in the chronological order in which they would ordinarily arise in a typical case, keeping in mind that there are few typical cases which present the textbook picture of the disease and that many or nearly all of these symptoms may be absent in some cases.

As previously stated, symptoms of nausea, vomiting, and diarrhea may make their appearance in twenty-four to forty-eight hours after the consumption of infected meat. Diarrhea may be severe with as many as 15 or 20 stools a day. It may last only for a day or two, or may continue for several weeks. In patients having a severe diarrhea at onset, the generalized symptoms may not be as severe as in those cases in which diarrhea is absent. A feeling of pressure in the abdomen may be experienced and there may be abdominal discomfort or evident pain. Constipation occurs in a certain percentage of the cases. In some cases, gastrointestinal symptoms do not initiate the disease and may not appear for a week or two following the ingestion of the infected meat. This delayed appearance is usually associated with a milder manifestation of such symptoms.

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*Presented at the North Dakota State Medical Association annual meeting, Jamestown, May 20, 1942.

†Chief, division of zoology, National Institute of Health, U. S. Public Health Service.

Following the initial gastrointestinal symptoms, there is a feeling of malaise, beginning weakness, slight headache, and cough which may make its appearance at about the eighth to tenth day following infection. It would appear probable that the cough is associated with the passage of the trichina larvae through the capillary bed of the lungs and not with secondary pulmonary complications which usually arise later in the course of the disease. Upper respiratory symptoms may appear at this stage with coryza and laryngitis. The patient may complain also of pharyngitis or sinusitis.

Fever usually appears from the tenth to fourteenth day, often accompanied by chills, sweats, and a marked headache which is usually frontal in location. The fever is of the intermittent type, in most cases reaching a peak in the evening although in some cases the course is reversed. The temperature may reach 105 or 106° F. Remission of the fever is usually by lysis. Difficulties in respiration may be encountered at this stage.

The initial ophthalmic symptoms consist of burning of the eyes and photophobia. The conjunctiva is frequently reddened and edematous. Subconjunctival hemorrhages are common and often take a peculiar form, starting at the inner or outer canthus and extending fan-shaped to the edge of the pupil. Hemorrhage may be so extensive as to involve the entire sclera.

These symptoms usually precede by a day or two the appearance of periorbital edema, which is one of the most valuable of the clinical diagnostic signs. The edema usually makes its appearance about the twelfth to fifteenth day after infection and before the onset of marked generalized symptoms and severe muscle pain. The edema varies in intensity sometimes extending over the whole facial area. In many cases of the disease the ophthalmic symptoms are the first outstanding manifestation of illness and for this reason the ophthalmologist may be the first to see these patients.

With increasing numbers of larvae reaching the muscles from the fifteenth day onward, marked muscle tenderness ensues followed by myalgia of increasing severity. Pain may be generalized but on the other hand in some cases seems to be limited to isolated groups of muscles. With involvement of the diaphragm, respiration may become painful and labored and in some cases a paralysis of the diaphragm follows. The myalgia may be classified roughly on the basis of spontaneous pain and exercise pain. In some cases, involvement is sufficient to produce the former type with continuous discomfort and suffering of the patient; in other cases, pain is evident only on exercise of the infected muscles.

Skin lesions are encountered not infrequently in trichinosis. They usually take the form of a macular eruption of a scarlatiniform type. The macules are usually reddened and sometimes thickly set occurring particularly on the face, neck, arms and trunk. Sometimes they coalesce to form purplish ecchymotic areas. These lesions have been mistaken for the "rose spots" of typhoid fever and for the macular eruptions present in endemic typhus. McNaught[2] has described subungual hemorrhages which may serve as an important diagnostic feature. However, these hemorrhages are of rather infrequent occurrence. Urticaria develops in some cases and a certain percentage of affected individuals complain of itching of the skin even when no visible lesions are present.

It will be recalled that trichina larvae penetrate the muscle fibers and sometimes wander extensively through the heart although they do not encyst there. This migration of the larvae through the myocardium may produce evidences of acute inflammatory change. Histologically the picture presents cloudy swelling, extravasations of red cells, fragmentation of the fibers, necrosis, and interstitial infiltration. The predominant cells at the onset of the invasion are lymphocytes, mononuclears, and eosinophiles; later there is fibroblastic formation. The myocardial damage is indicated by electrocardiographic changes, dependent edema, precordial pain, and rales at the bases of the lungs with evidence of passive congestion and shortness of breath. A fall in blood pressure and rapid pulse presage cardiac failure, which may occur in heavily infected individuals. Recovery from the myocardial damage is usually relatively slow; as a rule electrocardiographic tracings indicate a return to normal in three to four months.

Pneumonia is one of the most common and most serious of the sequelae of trichinosis. As a rule, it occurs from the third to the fifth week and is usually of the lobular type. Damage to the capillary bed and the walls of the alveoli by the passage of numerous larvae through the lungs provide a situation favorable for secondary bacterial invasion. The patient may have begun to improve or may be seemingly on the way to recovery when a sudden rise in temperature and an increased leucocytosis herald secondary pneumonic involvement.

Trichina larvae not infrequently invade the central nervous system giving rise to many different and often bizarre clinical pictures. As a rule, symptoms of central nervous system involvement come quite early in the course of the disease. The clinical picture may resemble an encephalitis, encephalomeningitis, tuberculous meningitis, poliomyelitis, or even cerebral hemorrhage with localized paralysis and focal symptoms such as speech or auditory defects. There may be emotional instability, coma or delirium, restlessness, muscular twitchings, relaxed sphincters, tonic or clonic convulsions, and exaggerated motor reflexes. Cases with nuchal rigidity and paralysis of the extremities with hypoactive or absent reflexes resemble closely those of acute anterior poliomyelitis and often present a difficult problem for diagnosis. Convalescence following central nervous system involvement is usually a slow process and may require weeks or months.

To demonstrate the difficulties facing the physician in the diagnosis of trichinosis in its various phases, reference is made to Figure 1, which shows the symptoms most commonly exhibited and the conditions with which such symptoms may be confused. The symptoms enumerated are by no means all those which may occur during the course of the disease but they are illustrative of the most common syndrome. Probably about two-thirds of cases of the disease show symptoms chiefly of weakness, fever, myalgia, and headache, symptoms which are so commonly associated with influenza or la grippe that it is not surprising that many mild cases of trichinosis may be mistaken for these more common conditions.

The outcome of the disease depends considerably on the degree of infection and the natural resistance of the patient. In those individuals suffering from a heavy invasion and showing marked prostration and toxemia the prognosis is necessarily in doubt for a period of three to four weeks. In moderately severe cases, recovery usually ensues but in cases with severe fulminating infection and in those suffering from pulmonary or neurological complications the prognosis is manifestly poor. However, the mortality from the disease is relatively low and based on the number of reported cases in the United States during the past ten years, has been slightly over 6 per cent.

DIAGNOSIS

Recognition of the disease is mostly a matter of differentiating it from the many other conditions which it simulates so closely. Diagnosis is easier in severe cases than in those showing mild clinical symptoms since such symptoms may be easily mistaken for those of more prevalent diseases. A history of ingestion of uncooked or undercooked pork may provide a clue but the incubation period of the disease is so variable that the patient may not associate his illness with pork consumption. Epidemics from a common source of infection are more easily recognized than are sporadic cases of the disease. In view of the widespread distribution of the parasite in this country, it would seem advisable to insist on a differential blood count in all acute systemic conditions involving fever, headache, weakness, and muscle pain with or without gastrointestinal symptoms. The presence of an eosinophilia in such cases is strong presumptive evidence for a diagnosis of trichinosis.

In suspected cases of the disease, clinical observations should be supplemented by usual laboratory procedures and by intradermal and precipitin tests. The blood picture in trichinosis is variable. Usually there is a leucocytosis with the number of white cells ranging between 10,000 to 20,000. However, occasionally a leucopenia is present. Most cases show some eosinophilia although individuals suffering from concomitant bacterial or virus infections may not show any change in the differential blood picture. The eosinophilia may rise to 80 per cent or more but there is no correlation between the eosinophil count and the degree of infection. Eosinophilia usually appears on the seventh or eighth day after infection, although it may not become evident before the third week. The percentage usually progresses rapidly to a peak but considerable variation may occur from day to day. A rapid drop in the eosinophil count may occur just before fatal termination. Although information concerning the blood sedimentation rate is meager, it is possible that there may be an acceleration, particularly in the second or third week of illness.

STAGES	TIME OF ONSET AFTER INFECTION	LOCATION OF PARASITES	SYMPTONS WHICH MAY BE EXHIBITED	SOMETIMES TENTATIVELY DIAGNOSED AS:
ENTERAL	24 TO 72 HOURS	LARVAE AND ADULTS IN INTESTINAL LUMEN AND VILLI	NAUSEA VOMITING DIARRHEA CONSTIPATION ABDOMINAL PAIN	TYPHOID FEVER FOOD POISONING INTESTINAL INFLUENZA COLITIS APPENDICITIS
PARENTERAL	AFTER 4 TO 5 DAYS	LARVAE IN BLOOD STREAM AND MUSCLES	EOSINOPHILIA IRREGULAR HYPERPYREXIA EDEMA (ESPECIALLY SUBORBITAL) CONJUNCTIVITIS PHOTOPHOBIA MYALGIA SORE THROAT DYSPNOEA COUGH SCARLATINIFORM RASH ROSE SPOTS URTICARIA PLEURISY PNEUMONIA	ARTHRITIS RHEUMATISM UPPER RESPIRATORY INFECTION LARYNGITIS CONJUNCTIVITIS INFLUENZA INTERCOSTAL NEURITIS MEASLES FRONTAL SINUSITIS ASTHMA PLEURISY PNEUMONIA
		LARVAE PASSING THROUGH HEART	CHEST PAIN TACHYCARDIA APICAL MURMURS DICROTIC PULSE	MYOCARDITIS ENDOCARDITIS
		LARVAE IN BRAIN AND MENINGES	SEVERE HEADACHE MALAISE MARKED HYPERPYREXIA DISORIENTATION DELIRIUM COMA	ENCEPHALITIS MENINGITIS POLIOMYELITIS

Fig. 1. Symptomatology of trichinosis and the conditions with which the disease may be confused.

In uncomplicated cases, there is little deviation in blood chemistry values and determinations are of little aid from a diagnostic standpoint. In a like manner, even in patients showing marked neurological involvement, the cerebrospinal fluid is usually normal. Although there is usually some albuminuria, urinalysis usually discloses nothing of diagnostic significance. Examination of the blood, spinal fluid, and feces for trichina larvae is frequently recommended but in our experience such examination does not constitute a reliable diagnostic procedure. Isolation of larvae from these sources is accomplished in only a relatively small percentage of cases. There is more opportunity for finding larvae in heavily infected cases but even in such cases the findings are not consistent.

A positive biopsy provides definite evidence for the presence of the disease but success in finding trichina larvae in biopsied muscle is conditioned largely by factors such as the time after infection at which the biopsy is taken, the degree of infection, and the methods employed in examining the tissue. Biopsies taken before the twenty-first day after infection will frequently be found negative because the larvae will not have reached the muscles in sufficient concentration and because young larvae are not yet coiled and are difficult to detect. The sectioning of biopsied muscle is the least effective of methods of examination. The entire amount of tissue should be pressed between two heavy plate glass slides held in a steel frame and examined under the low power of a compound microscope. The tissue should then be digested in artificial gastric juice and the sediment examined for larvae. Even with these methods we have been able to find larvae only in slightly over half of a fairly large series of known cases of trichinosis. Consequently, a negative biopsy should not rule out a diagnosis of the disease.

During the last few years, the perfection of the intradermal and precipitin tests has provided two very reliable diagnostic procedures. Antigen for these tests is made from dried, powdered trichina larvae. Material for the intradermal test is now available commercially. When carried out with proper dilutions of the antigen, these tests are species specific and will not give positive reactions in infections with other worm parasites.

The intradermal test is carried out by injecting with a 26 gauge, ½ inch needle 0.01 to 0.1 cc. of a 1:10,000 dilution of the antigen into the skin of the forearm after proper preparation of the site. A control injection is made in the same arm with the diluent used in the antigen. A positive reaction appears usually within 15 to 20 minutes although rarely the reaction may not reach its height before twenty-four hours. When 0.1 cc. of the antigen is injected, it is considered usually that the formation of a wheal with a diameter larger by 5 mm. or more than that of the control wheel, with or without pseudopodia, represents a positive reaction. The wheal is usually surrounded by a zone of erythema but the extent of the erythema is not as important from the standpoint of reading the test as are the size of the wheal and the presence of pseudopodia. The intradermal test is not usually positive until after the second week of infection.

When carried out with antigen dilutions of 1:80 to 1:1280, the precipitin test is usually very specific. The test can only be employed satisfactorily on clear, non-chylous, non-hemolyzed serum and with antigen which has not been preserved with phenol. Until antigen for precipitin tests is available commercially, the Division of Zoology, National Institute of Health, is in a position to conduct such tests on samples of blood serum forwarded to it. The precipitin test does not usually become positive until the beginning of the third week of infection.

In evaluating these tests, it should be remembered that about one of every six persons examined at autopsy has been found to have a trichina infection. It is entirely possible that some persons with a non-clinical infection may react to the tests. Furthermore, positive intradermal tests have been obtained for as long as seven years and positive precipitin tests for as long as two and one-half years after recovery from a clinical attack of trichinosis. Non-specific reactions may also occur at times. Because of these facts, care should be exercised in the interpretation of the tests and the results should be considered in relation to the clinical observations, the differential blood picture and the history of the case.

TREATMENT

Unfortunately, there is no specific treatment for trichinosis since there is no known drug or combination of drugs which is effective for removal of the adult worms from the intestinal tract or the destruction of the larvae in the blood stream or voluntary muscles. In our laboratory, tests with 121 different chemical compounds on nearly 4,000 experimental animals have failed to give any leads of promise in this respect. In the absence of specific treatment, general therapeutic measures should be employed in an effort to keep the patient comfortable, to fortify his resistance, to combat various symptoms as they arise, and to prevent, as far as possible, secondary bacterial complications.

It has been the general experience of those who have handled many cases of the disease that the patients are more comfortable and respond better when simple therapeutic measures are employed. It is recommended frequently that purgation be employed and that anthelmintics be administered early in the course of the disease in order to remove pre-adult and adult worms from the intestinal tract. Unfortunately, the disease is seldom diagnosed sufficiently early in its course that such procedures are of definite benefit; furthermore, experimental evidence does not indicate that adult worms can be removed by any of the anthelmintics now available. It is considered that measures of this sort not only fail in the purpose for which intended but that they help to dehydrate the patient and add to the toxemia. Consequently, there is no rational basis for the use of purgatives; or of anthelmintics such as carbon tetrachloride, tetrachlorethylene, oil of chenopodium, etc., directed toward the removal of adult worms; or of arsenicals, sulfonamide compounds or others directed against the destruction of the larvae in the blood stream or voluntary muscles. The sulfa drugs have no specific action on trichinae and their use only makes the patient more uncomfortable and leads to no benefit. However, these compounds can be employed rationally and should be used in cases of trichinosis in which signs indicate impending bacterial complications. No doubt their administration in secondary bronchopneumonia will save many patients who might otherwise succumb.

The trichinosis patient should be kept in bed until all possibilities of secondary bacterial involvement have passed. Antipyretics and analgesics are definitely indicated and repeated doses of aspirin, acetanilid, codeine, and the barbiturates should be employed in order to control the temperature and to allay the discomfort and myalgia. If administration of these drugs fails to control the pain, resort may be had to morphine.

Persistent constipation should be combated by laxatives but every effort should be made to prevent dehydration. In this connection, liberal use of fruit juices is indicated.

If the patient is nauseated and unable to retain liquids taken by mouth, intravenous infusions of 5 per cent glucose in normal saline should be used to provide an adequate fluid intake. If the patient is markedly toxic and acutely ill, transfusions of whole blood or plasma may be employed with profit.

After recovery has set in and the patient can take solid food, it is advisable to provide a well rounded diet with plenty of fruits, vegetables, and other foods with high vitamin content. It is questionable, however, whether the administration of excessive amounts of vitamin D is of any value to the patient, even though experimental evidence indicates that such administration hastens the calcification of the trichina cysts.

Finally, the patient should be watched carefully until recovery is complete and suitable precautions should otherwise be taken to prevent secondary complications. Undue exposure or premature resumption of the ordinary routine may result particularly in the onset of pneumonic complications.

Incidence of Trichina Infection

During the past six years there has been conducted in our laboratory a survey of trichina infection in various population groups in the United States. At various times progress reports[3,4,5,6] have been published on the results of this survey. Up to May 1, 1942, a total of 5,362 diaphragms had been examined from 169 hospitals in thirty-seven states, the District of Columbia, and Puerto Rico. Of these specimens, 853, or 15.9 per cent, were found to contain trichinae. This material was entirely unselected and came from routine necropsies on cases in which there had been no suspicion of a trichina infection. Over 1,100 of the diaphragms were chosen on a chance basis in hospitals picked at random. In addition to these examinations in the National Institute of Health, there has been reported by others a total of 5,887 examinations, of which 817, or 13.9 per cent, were positive. Many of the positive cases found in our laboratory had only light infections but approximately 4.2 per cent carried infections which probably were sufficient to have caused clinical symptoms of disease. The results of these surveys serve to indicate the widespread distribution of the parasite and the potential opportunities for acquiring trichinosis.

Since most cases of trichinosis in man are acquired through the consumption of uncooked or undercooked infected pork, it is of interest to know something of the sources of this infection in swine. In studies carried out by Kerr[7] of the California State Department of Health in coöperation with this Service, the hogs from which specimens were examined were traced back to the farm and the type of food was ascertained. Infection was found in 6.4 per cent of 1,701 hogs fed on raw garbage, in 0.6 per cent of 1,109 hogs fed on grain plus kitchen scraps, and in 0.4 per cent of 2,436 hogs fed exclusively on grain. No hogs fed on cooked garbage were found infected. Since these results do not differ materially from those obtained by other investigators, it is quite apparent that swine maintained on raw garbage are the chief source of human trichinosis. Infection is carried by scraps of trichinous pork in the garbage and this practice provides for a constant source of exposure and a never ending cycle of transmission from hog to hog. Evidence indicates that many municipalities are contributing to the spread of trichinosis in this way. A survey conducted by the writer[8] sometime ago indicated that 403, or 52.7 per cent, of 764 cities of 10,000 population or over disposed of municipally collected garbage in whole or in part by feeding it to hogs. In only a few of these cities was the garbage cooked before its consumption by swine.

Prevention and Control

At the present time the burden of protection against trichinosis rests for the most part on the consumer of pork since there are no general measures in force for the control of the disease. In this country, there is no microscopic examination of pork for trichinae. However, the federal meat inspection regulations provide for the processing for the destruction of trichinae of all pork used in products customarily eaten without cooking by the consumer. Such products include frankfurters, salami, mettwurst, cervelat, lachsschinken, and many others. These products are perfectly safe for use without cooking provided they have been produced in a plant operating under the federal meat inspection regulations or equivalent regulations. However, only about 70 per cent of the pork produced in this country is federally inspected, and there can be no assurance that products of this kind produced in plants not under such inspection or equivalent inspection are safe for use without cooking.

While various measures have been advocated for the control of trichinosis, it would seem that at the present time the most feasible of these is the regulation of garbage feeding to swine. The proper cooking of garbage before its consumption by swine would not only prevent considerable numbers of trichinous hogs from reaching the market but would decrease opportunities for infection to even a greater degree because of the relatively heavier infections in hogs maintained on this type of feed.

References

1. Hall, Maurice C.: Studies on trichinosis. III. The complex clinical picture of trichinosis and the diagnosis of the disease, Pub. Health Rpts. 52:539 (April 30) 1937.

2. McNaught, James B.: The diagnosis of trichinosis, Am. J. Trop. Med. 19:181 (March) 1939.

3. Hall, Maurice C., and Collins, Benjamin J.: Studies on trichinosis. I. The incidence of trichinosis as indicated by postmortem examinations of 300 diaphragms, Pub. Health Rpts. 52:468 (April 16) 1937.

4. Nolan, M. O., and Bozicevich, John: Studies on trichinosis. V. The incidence of trichinosis as indicated by postmortem examinations of 1,000 diaphragms, Pub. Health Rpts. 53:652 (April 29) 1938.

5. Wright, Willard H.: Studies on trichinosis. XI. The epidemiology of Trichinella spiralis and measures indicated for the control of trichinosis, Am. J. Pub. Health 29:119 (Feb.) 1939.

6. Kerr, K. B., Jacobs, Leon, and Cuvillier, Eugenia: Studies on trichinosis. XIII. The incidence of human infection with trichinae as indicated by postmortem examinations of 3,000 diaphragms from Washington, D. C., and five eastern seaboard cities, Pub. Health Rpts. 56:836 (April 18) 1941.

7. Kerr, K. B.: Trichinosis problem in California. Report of a survey 1940-1941. Cal. State Printing Office, Sacramento. 37 pp.

8. Wright, Willard H.: Studies on trichinosis. XIV. A survey of municipal garbage disposal methods as related to the spread of trichinosis, Pub. Health Rpts. 55:1069 (June 14) 1940.

Gastroscopic Observations in Duodenal Ulcer*

J. B. Carey, M.D.
R. S. Ylvisaker, M.D.
Minneapolis, Minnesota

PATIENTS with duodenal ulcer have either normal gastric mucosa, gastritis, or gastric ulcer. Examination by the flexible gastroscope of 70 patients with roentgenologically determined duodenal ulcer showed normal gastric mucosa in 16, hypertrophic gastritis in 27, superficial gastritis in 10, gastric ulcer in 9, and a condition of hypertonicity with hypersecretion in 8 (chart 1). Thirty patients who had been operated upon because of duodenal ulcer were also examined. All of these patients were referred to the gastroscopic clinic of the University Dispensary, or were examined as private patients, for definite reasons—most of them either because they were not doing well, were subject to repeated recurrences, had anemia, or showed roentgenologic signs suggestive of gastritis. In every instance the diagnosis of duodenal ulcer was based upon unequivocal roentgenologic evidence, the history, and other usual, established criteria.

This set of observations is a segment from an aggregate of about 1,800 gastroscopic examinations.

The terminology for the conditions found is that which has been generally accepted by gastroscopists in this country, following Schindler's classification.

The diagnosis of gastric ulcer needs no explanation or qualification, except to indicate that in only two patients were other lesions of the mucosa seen; in one case a few small, submucosal hemorrhages were found high up in the body of the stomach, and in another case some edema of the mucosa was present around the angulus region of the stomach. Otherwise the gastric mucosa in patients with gastric ulcer associated with duodenal ulcer appeared to be normal. This conforms to our experience with gastric ulcer occurring alone; in about 75 such cases, gastritis, if present at all, was immediately contiguous to the ulcer.

Gastric mucosa designated as hypertrophic gastritis, had alterations varying from the typical warty appearance with coarse, rigid, and tortuous folds, to a condition in which the mucosa was dull, thick, and velvety, with thickened folds but without notable irregularities of the surface. In only eight of these cases was the antrum considered to be involved in the gastritic process.

Some of the eight cases called simply "hypertonicity and hypersecretion" might have been interpreted as being gastritis in that the mucosa appeared to be redder and thicker than normal, but since no signs of edema, erosion, exudate, or definite hypertrophy could be recognized, the term descriptive of the functional disturbance alone was applied.

The antrum was apparently affected in three of the ten cases with superficial gastritis. In all of the patients with gastritis and most of those with normal mucosa or gastric ulcer, the antrum region was seen to be hyperactive, either with rapid, frequent and deep contraction waves running to the pylorus, or with the entire antrum in a contracted state. The pylorus generally closed violently, squeezing the mucosa into irregular, redundant folds. These circumstances may be a partial explanation for not having observed mucosal changes of the antrum more often. Because of the intense activity of the antral mucosa, fine deviations from normal could not be identified.

Retention, either as a past, remote experience, or existent at the time of examination, did not seem to influence the state of the gastric mucosa. In fact, one individual with retention had normal mucosa, and two had simply hypertonicity and hypersecretion. Hemorrhage was no more common with one type of gastric mucosa than another; actually, more patients whose stomach mucosa was normal had bled or were bleeding than did those with gastritis. The only perforations of duodenal ulcer occurred in patients with normal gastric mucosa. No patient with associated gastric ulcer had any of the three common complications.

The ages of the patients examined ranged from 20 to 77 years, the greatest number being in the 30-39 and 50-59 decades (chart 2). The only notable facts derived from the age grouping were that two of the oldest patients, one 70 and another 72, had gastric ulcer and two others, 72 and 76, had normal gastric mucosa.

The duration of symptoms at the time the examinations were made is charted for the various modifications of gastric mucosa observed (chart 3). There were fewer patients with symptoms prevailing less than a year than would ordinarily be anticipated. Four of the 16 patients (25 per cent) with normal gastric mucosa had symptoms dating back more than ten years, whereas 22 of the 54 patients with pathological mucous membrane (about 40 per cent) had had complaints for longer than ten years. This may indicate that patients with abnormalities of the gastric mucosa associated with duodenal ulcer are more likely to chronicity, intractability, and recurrences.

Information about 50 patients after the examination had been completed is contained in Chart 4. Nine of the 50 were comfortable when last seen, and were apparently discharged as cured or arrested. Seventeen patients are coming to the clinic and maintaining a schedule of diet and medication; in other words, they are still being treated. Eighteen patients have been seen from time to time and have declared that they must adhere to a diet and continue to take medicine in order to be comfortable; only one in this group has a normal gastric mucosa. Six patients were operated upon after gastroscopy had been done, but at such recent dates that results are as yet uncertain.

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*From the gastroscopic clinic, department of medicine, University of Minnesota Medical School. Presented to Joint Sections of Gastroenterology and Proctology, and Pathology and Physiology, American Medical Association meeting, Atlantic City, June 12, 1942.

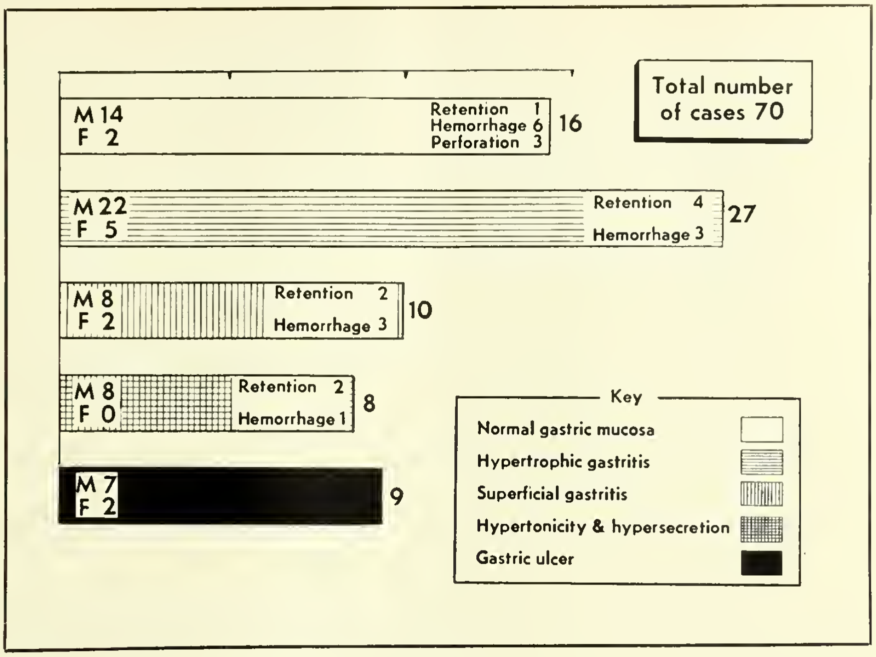

Chart 1.

Gastroscopic examinations were also made of 30 patients with duodenal ulcer who had been operated upon (chart 5). Most of the operations were gastroenterostomies done many years before gastroscopy; a few were resections of various types performed more recently. Eight patients had had second operations, generally resections following an original gastroenterostomy. Only two patients were without subjective symptoms when gastroscopy was done; one was examined because of anemia, another for observation of the result of a recently performed subtotal gastric resection. In both of these patients the gastric mucosa was normal. Six other patients had normal gastric mucosa, although some of these had jejunitis. Atrophy of the mucosa accompanied superficial gastritis in four patients, a situation not seen in patients with duodenal ulcer not operated upon. One of these patients has achlorhydria and anemia of the iron deficiency type and must use iron and vitamin B continuously to maintain normal values of the blood elements; she also has diarrhea. The gastric ulcer discovered in one patient formed five years after gastroenterostomy had been done for duodenal ulcer.

Discussion

The association of gastritis and duodenal ulcer has been noted by several observers. In a series of 16 cases of duodenal ulcer Schloss, Ettinger and Pratt[1] noted gastritis in 13 and a gastric ulcer in one. In 45 cases of duodenal ulcer Royer, Bur, and Montejano[2] found normal gastric mucosa in 21, ulcerative gastritis in one, atrophic gastritis in 3, hypertrophic gastritis in 9, other forms of gastritis, apparently largely superficial, in 9, and gastric ulcer in 2. Templeton and Schindler[3] report 25 individuals with normal gastric mucosa in 75 cases of duodenal ulcer; the other patients had hypertrophic gastritis, superficial gastritis (some with atrophy) or a condition described as hemorrhagic spots in normal mucosa. Other references to the subject are made by Benedict,[4] Herman Taylor,[5] and Moutier;[6] Taylor[5] states that "duodenal ulcers appear to be invariably associated with hyperplastic mucosa, usually of a more marked degree than in gastric ulcer, so much so that absence of hyperplasia in the gastric mucous membrane is strong evidence against duodenal ulceration." Moutier[6] also apparently found gastritis more often than others, for he says that "in duodenal ulcer, gastritis is the rule."

In the cases of duodenal ulcer here presented, the ratio of normal gastric mucous membranes to those showing changes is about 23 per cent. This is about the same as that obtaining in all of our gastroscopic examinations,

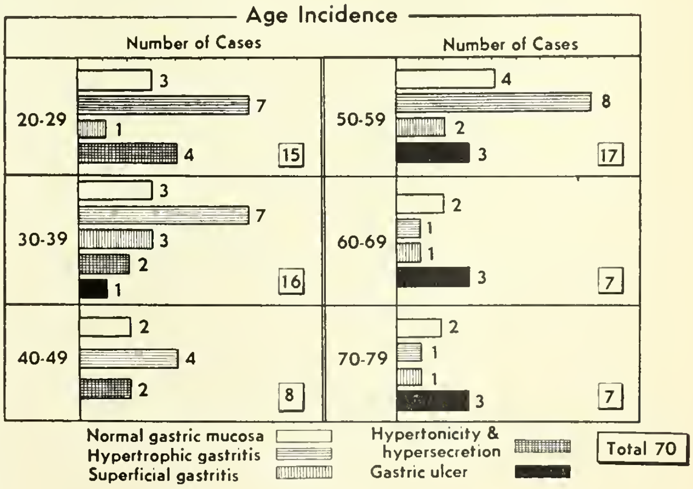

Chart 2.

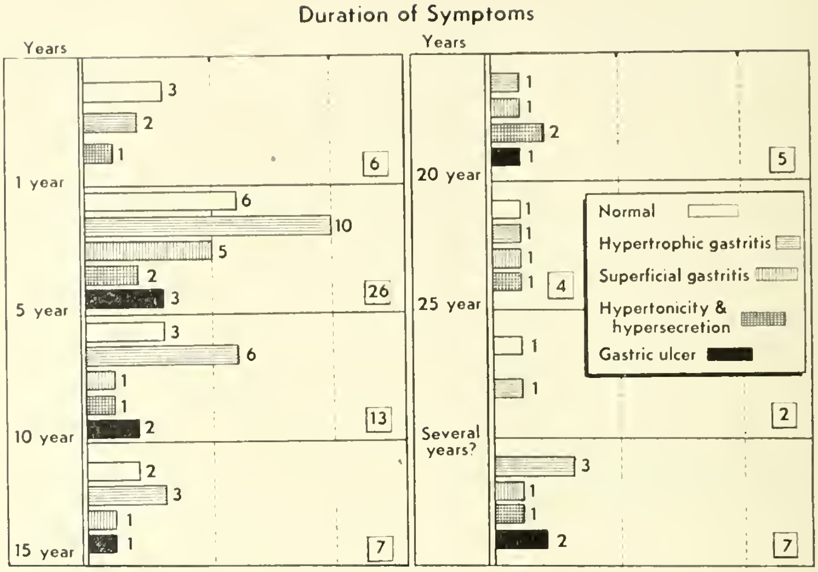

Chart 3.

which was 22.5 per cent incidence of normal gastric mucous membranes in the first 1,000 cases.

Gastroscopic findings seem to be at variance with histologic studies of necropsy and surgical specimens. Faber,[7] Konjetzny,[8] and Tomada[9] have all reported the universal occurrence of gastritis and ulcer of both stomach and duodenum. We are permitted to mention the work of Robert Hebbel,[10] of the department of pathology, University of Minnesota, which is to be published soon. Examining stomachs resected from 78 patients with duodenal ulcer, 15 with gastric ulcer, and 13 with both gastric and duodenal ulcers, Hebbel found gastritis of the antrum in all, and gastritis of the corpus in 30 per cent. The changes in the stomach were the same no matter where the ulcer was located. The inflammatory reaction was that of lymphocytic infiltration of greater or less extent, with an unmistakable tendency toward atrophy of the mucosa, particularly of the antrum. Only one example of hypertrophic gastritis was remarked.

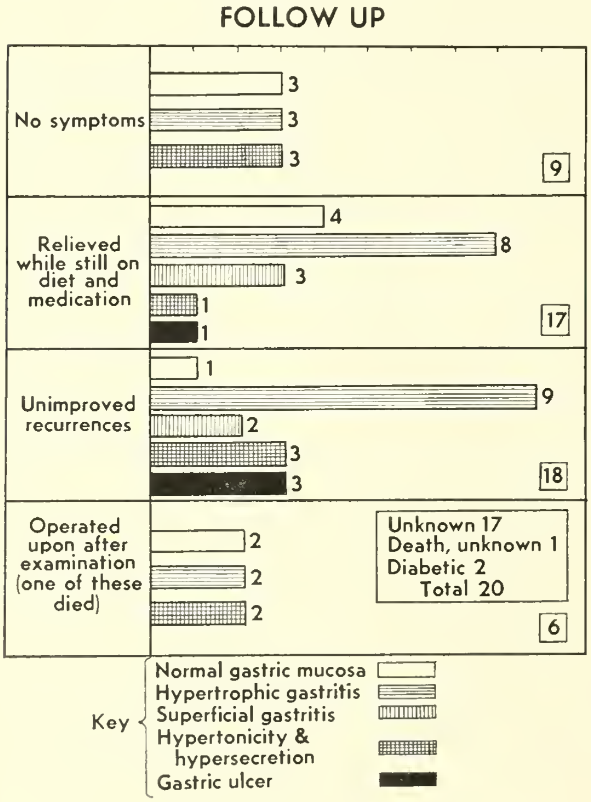

Chart 4.

The only specific mention of involvement of the antrum noted gastroscopically is made by Moutier[6] who reported that gastritis was present "maximum niveau de l'antre, mais peut existe egalement au niveau de la petite courbure." The explanation for this discrepancy in the localization of the gastritic changes may lie in the circumstance already described; namely, that in nearly all cases the antrum was either in extremely violent activity or reduced to a veritable tube by more or less persistent hypertonic contracture. Visualization was never *en face,* but always tangential; consequently finer details of the mucosa could not be clearly seen. In any event, we could determine the presence of gastritis with certainty only eleven times.

The explanation for the existence of changes designated as gastritis in all specimens examined histologically must be sought from several sources, the simplest and most reasonable being that, as emphasized recently by Robertson[11] and more remotely by Faber,[7] the most frequent abnormality in an otherwise perfectly normal stomach is hemorrhage in the superficial layers of the mucosa. These capillary hemorrhages result in necrosis and formation of small superficial ulcerations, giving rise to no recognizable clinical phenomena, but leading to residual collections of lymphocytes, irregular thickening and fibrosis of the muscularis mucosae, atrophy of the specialized gastric cells, and more or less hyperplasia of the mucous glandular cells with varying degrees of disorganization of all elements. In other words, conditions seen by pathologists may often represent past happenings in the gastric mucosa, with no immediate relation to the ulcer present. It is probably true that active inflammatory changes can only be visualized in living tissue through which blood is constantly circulating. The only point still at issue is the distinction between the different types of gastritis. It has been suggested that the thickness or thinness of the gastric mucosa may be a function of the muscularis mucosae and not an indication of hypertrophy or atrophy.[12]

From all experience the occurrence of gastritis in patients with duodenal ulcer is common enough to warrant gastroscopic examination, particularly if the disease is refractory, chronic or recurrent, or if operation is contemplated. This later consideration is important in the light of the conditions found in the postoperative stomach. As Benedict,[4] puts it, "A knowledge of the degree and location of associated gastritis should . . . influence the surgeon in deciding for or against operation and in planning the type of operative procedure. If a diffuse gastritis or severe gastritis of the fundus is present, [it] will persist [after operation] and continue to give symptoms."

To decide whether the presence of active gastritis is responsible for chronicity of the ulcer, intractability to treatment, recurrences, or complications will require a study of a group of patients in whom duodenal ulcers have been cured or arrested for considerable periods of time. The relative incidence of gastritis in such patients might serve as an indication of the influence of general gastric mucous membrane alterations on the clinical course pursued by duodenal ulcer. In spite of the strong presumption that gastritis affects, at least in part, the behavior of duodenal ulcer, that matter must be left open pending further study.

Summary

The incidence of gastritis, as determined by gastroscopic examination, was discovered to be about the same in patients with duodenal ulcer as in the total population of the gastroscopic clinic. An analysis of the data concerning duration of symptoms, response to therapeutic regimen, incidence of recurrences and complications from 70 patients with duodenal ulcer not operated upon and 30 patients with duodenal ulcer for whom operations had been performed, permits the tentative assumption that conjoined gastritis may condition the course of ulcer of the duodenum. Further study of patients with duodenal ulcer who have been cured or arrested, by whatever means, is necessary to complete the implications of this study. At the very least, it would seem to be advisable to visualize the gastric mucosa of patients with duodenal ulcer who are not doing well, are having recurrences in spite of repeated attempts to control the disease, or those for whom surgical intervention is being considered.

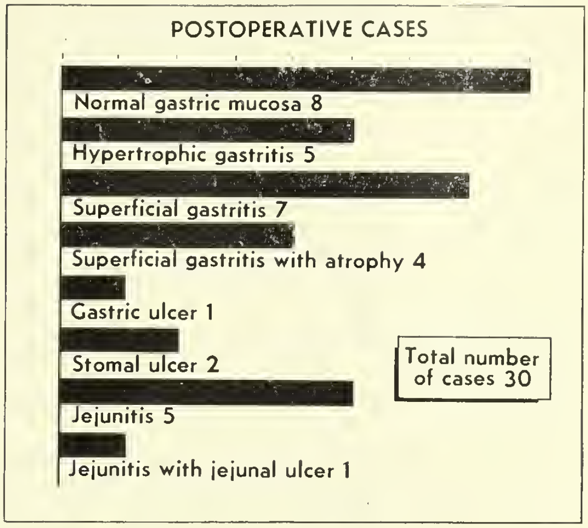

Chart 5.

References

1. Schloss, J., Ettinger, A., and Pratt, J. H.: Diagnosis of Diseases of the Stomach by Gastroscopic and X-ray Relief Studies, Am. J. M. Sc. 193:171 (Feb.) 1937.

2. Royer, M., Bur, J. B., and Montejano, B.: Importancia de la Gastroscopia an el Diagnostico de las Enfermadades del Estomago, La Semana Medica 1:1487 (June 3) 1937.

3. Templeton, F. E., and Schindler, R.: Roentgenologic and Gastroscopic Studies in Chronic Gastritis and Peptic Ulcer, Am. J. Roentgenol. 61:354 (Mar.) 1939.

4. Benedict, E. B.: Surgery of the Stomach and Duodenum; Gastroscopic Examination, New England J. Med. 222:427, 1940.

5. Taylor, Herman: Practical Evaluation of Gastroscopy, Lancet (London) 240:132 (Feb. 1) 1941.

6. Moutier, F.: Traite de Gastroscopie, Masson et Cie, 1935, chap. 13, p. 158.

7. Faber, K.: Gastritis and Its Consequences, Oxford Med. Publ., 1935.

8. Konjetzny, G. E.: The Chronishe Gastritis des Ulcusmagens, Zentralbl. f. chir. 50:1026, 1923; Zur Gastritis Frage, Wien. Klin. Wochnschr. 46:451, 1933.

9. Tomada, M.: Beitrag zur Kenntnis der Geschwursbildung im Magen und Duodenum; Arch. für Klin. Chir. 190:254, 1937.

10. Hebbel, Robert: Personal report of work to be published.

11. Robertson, H. E.: Ulcerative Gastritis and Residual Lesions, J.A.M.A. 112:22 (Jan. 7) 1939.

12. Hamperl, H.: Die gröbere und feinere Gestaltung der Schleimhaut des Magendarmkanals in Abhängigkeit von seiner Muskulatur, Virch. Arch. f. Path. Anat. 305:432 (Dec.) 1939.

Incoördination and Tension Due to Anxiety

Smiley Blanton, M.D.
New York, New York

ALL colleges have students who are so tense that they are awkward or cannot coördinate their muscles in a normal fashion. Such students present a problem to the educator who must look to medicine for his answer.

Everyone knows that the body has two nervous systems, the autonomic or sympathetic nervous system, and the brain-spinal cord nervous system. In the infant, the autonomic nervous system reacts to such primitive cravings as hunger and thirst, erotic feelings, and the like. When these cravings occur, the brain-spinal cord nervous system moves the muscles so as to satisfy them. But when he cannot satisfy a craving, three things happen: he becomes tense, he becomes restless, and he becomes irritable.

As the infant develops, the simple cravings become more complex and cannot be satisfied by simple, direct action. He may wish to write the great American novel, possess someone beloved, be a famous doctor or scholar, or prove himself adequate in his work. When these cravings — the fundamental urges of the personality — are frustrated, the muscles assume a peculiar stamp or "set", which we call "muscle tension."[1]

These cravings of the personality are accompanied by three fundamental emotions: love, any feeling *for* someone; anger, any feeling of irritation; and fear, any feeling of anxiety or danger.

From infancy on these cravings and emotions are etched into the muscle tensions for all to see. The posture, walk, the inflection and volume of the speech have been determined by the way the cravings have been satisfied or frustrated and the reactions of the three fundamental emotions to these satisfactions or frustrations.

Therefore, when we wish to train a student physically, we must also consider his muscle tensions, which arise from these emotions and cravings.

Frustrations are not the only cause of tension in the body. We know that the cortex of the brain controls the lower, more primitive nerve centers. According to neurologists, the athetoid movements of children with brain injuries at birth are recrudescent of the fish-like movements we made when we had fins instead of hands. You also know that the arm is tense and contracted and the leg extended in older people who have had a hemorrhage followed by hemaplegia. In these cases spinal cord, hind-brain, and mid-brain patterns cause the tension.

Now there are similar tensions in normal bodies when the cortex loses control of the lower nerve centers. This occurs in stuttering. Here primitive patterns erupt: suckling, swallowing, and vomiting spasms displace the usual lip and tongue movements. In chronic anxiety states, the anxiety blocks off the cortex's control of the lower nerve centers and the body becomes tense.

So to understand tension we must consider the earlier influences and attitudes of childhood which lie behind it. We must also remember the present, for a person's actions and attitudes are a compound of past and present. They are determined by how strongly his previous emotional patterns react to his present situation. It is difficult to prove the validity of this thesis.

"Do you mean to tell me," says a character in *Lady in the Dark*, "that a person has a neurosis because his nurse put his pajamas on crooked when he was three years old?"

The fundamental things in life are birth, death, procreation, and self-preservation. And for the first four or five years of life, a child is concerned chiefly with eating, elimination, and getting enough love from those around him.

An example of what we mean by primitive things in the physical world is offered when we ask what is the most important thing in the world today. One might answer, "Oh, the preservation of our liberties, the preservation of democracy, the preservation of the spiritual values of life." They are important—but not *the* most important thing in life. Presuming that the sun rises, that we have average rainfall, and that the temperature stays within a range of 120°—all of which are miracles—then the most important thing in the world is one to two feet of topsoil. In it grows the food which keeps us alive.

Now when we have a student who is anxious and worried and cannot coördinate, we are not dealing merely with the fact that he doesn't like some subject or that he is worried over a reduction in the family income. Studies and money annoy him, but if he lays his difficulties primarily on these things it is because he is using them to express some deep, buried, early acquired anxiety.

For example, why are some people so terrified that New York may be bombed? A woman living in Westchester County outside the city limits sent her children to Chicago. Another man has moved out of the city to Connecticut and dug a bomb shelter. Obviously this is much more than normal anxiety. The war brings out deeper fears in these people.

An example of the influence of early patterns is a Jewish professional man who had consciously rejected the teachings of his childhood. He did not believe in the Jewish regulations about pork, but he did not eat it, he said, because it had not been the custom in his home. One day one of his friends at dinner told him that what he had been eating for veal was really pork. Suddenly, without knowing why, he couldn't swallow the food in his mouth. He choked, left the table, and regurgitated his dinner. Perhaps this is an extreme example, but it shows how strong and permanent childhood patterns can be.

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[1] Kempf first discussed muscle tension twenty years ago in a penetrating manuscript, "The Autonomic Nervous System and the Personality."

Let us consider some students with tensions. The circumstances may seem extreme, but the same principles apply even in slight, mild cases.

A young man was referred to the medical department of a midwestern university because he couldn't do the simplest exercises—turn a somersault, march in step, throw a ball, or play tennis, golf, or baseball. He was so clumsy that his physical instructor thought he must have some organic defect, but a neurological examination showed that he was completely normal in that respect. When relaxed, he could coördinate naturally.

His tension had developed from a childhood situation. Just before he was born, his three-year-old sister had died. His mother was grief-stricken. Consequently, she unwittingly tried to make him take the place of his dead sister. She forbad him to play with other boys; he might get hurt. She made him feel that sports involving bodily contact, such as football, boxing, and wrestling, were wicked. So, unconsciously, he developed a feeling of guilt over his normal aggressiveness. When he tried to exercise and play games in college, this feeling of guilt returned; he became tense and uncoördinated, despite the fact that an older brother was a good athlete.

Again, a slender, attractive girl was referred to the university medical department because she could not learn either solo or ballroom dancing. She was good at boys' games, but she couldn't learn to do a simple waltz or one-step. She was especially tense when trying to dance with boys. She seemed bound in an iron girdle. You see many such girls at dances. They either poke the lower half of their bodies away from their partners, or move as though they had swallowed a steel rod. They are afraid of bodily contacts which, for some unconscious reason, they feel are to be avoided.

Why did this girl feel this way? She was the only girl among six children, and as she grew up she developed the feeling that she wanted to be a boy like her brothers. Besides, boys amounted to more. They were more popular, they had more rights and privileges, as they do in our civilization.

A third example is a boy of a distinguished family. His brother had been a famous football player before he became an Army officer. Another brother was an aviator in the Navy. This boy was artistic, but his talent didn't satisfy his craving to prove his adequacy. To allay his feeling of insecurity and inferiority in relation to his brothers, he tried to become an officer too. He failed in military school and then went to an eastern college. If he couldn't be an officer, he would prove himself by getting on the baseball team! But his struggle to be virile made him too tense to play any games at all, much less baseball.

Students like this will try to make one team and then another. They are as pitiful as mules trying to fly. If we say to them, "You can't make it," and brush them off, serious damage may be done to their psyche. They must be understood and their interests redirected.

Inability to win a game because of tension and incoordination is a very common difficulty. A tennis player who was brilliant as far as match point would make a wild shot and lose the whole match. A golfer was runner-up instead of winner of four state championships because he always missed the crucial putt. Such athletes have a fear of winning because it represents an attack on their opponent; it reminds them of aggressive impulses their parents forbad them to have when they were young. But if an athlete is going to win, he must have the "killer" impulse—on a play level and *without a sense of guilt*. Otherwise, he may lose every time.

What shall we do then with students who are so tense they cannot exercise naturally?

First, don't argue with them. Don't tell them, "*You must relax!*" They can't relax.

Our own attitudes, our own muscle tensions, are the most effective treatment. Be patient. When, for example, we painstakingly explain and demonstrate an exercise three or four times, and the student is just as clumsy as before, we may want to slap him down because we feel thwarted. But we must be patient. If we don't succeed one way, we must try another. We must have a real feeling of regard for our students. Our muscle tensions must be relaxed; we must be quiet and calm, friendly and yet detached. Then the students are likely to identify themselves with us. They feel that we are sympathetic; they know they can trust us.

This identification, this emotional transference, is our most effective weapon against tension. When we have once established it, we can teach through imitation. Tense students will identify themselves with us; confident, they will follow our relaxed, easy movements.

This same transference occurs everywhere—between teachers and students, employers and workers, doctors and patients. Thus, the dean of a leading university had no trouble talking to students in the classroom. But when he had to make a formal speech, he felt tense and exhausted. He consulted a doctor who knew something about psychology.

"Well, what happened when you were a child that makes you feel this way?" the doctor asked.

Finally the dean recalled reciting in school. "Oh, don't talk so much," the teacher had said. "Only little girls jabber like that." He remembered feeling quite crushed. And this same feeling now recurred whenever he had to make a speech.

"Well," said the doctor, "now we know what the trouble is. Take a cold shower every morning." The dean did and his tension disappeared.

Now what happened? Instead of "Take a cold shower," the doctor might have said, "Pull the lobe of your left ear thirteen times before breakfast." It would not have made any difference what the doctor said. There had been a transference between himself and his patient. And every time the patient stepped under the shower, the transference was renewed.

This transference is why different people get results from so many different methods of teaching. Students respond not to how and what is taught, but because they like the person who teaches it.

Two other things may help our work with tense students. We may give them relaxation exercises. We may have them lie down in groups of ten or fifteen and relax various parts of the body—hands, arms, feet, leg, etc. (Jacobson's method). If they have a transference for us, they will relax quite thoroughly. But if we are tense, we might as well "sing songs to a dead horse," as the old saying goes.

A second help is emotional re-education. Students might attend lectures by, and discuss their problems with, someone trained in psychological medicine. Another helpful thing is classes in speech and dramatics. For instance, we might let a very tense student play a character like bluff, uninhibited Falstaff, and so get the experience of being for once uninhibited.

Thus through emotional transference to one who is relaxed, through group relaxation exercises, emotional re-education, and classes in speech and dramatics, a great deal can be done to train the student who is tense and anxious.

The Incidence of Tuberculosis in Negroes of College Age

Howard M. Payne, M.D.†
Washington, D. C.

IN 1937 a grant from the District of Columbia Tuberculosis Association made it possible to establish a tuberculosis control program at Howard University. The success of the first year's work demonstrated the need for such a project. It has now become a permanent part of our annual program.

Howard University has a student population of about 2000 young Negroes annually. These students come from the Southern towns and cities and from the urban areas of the East and middle West. A study of the economic background of these students is in progress. Our present impression is that a large percentage of them depend upon their own efforts to pay for their education. This is true among the men. The women are dependent upon parents to a great degree. Observation of students over a period of several years has made it apparent that no accurate comparison of economic status can be made between the students at Howard and those of white colleges because the groups from which they originate are not comparable in an economic sense. However, we do believe that the group studied constitutes a cross-section of young people from the upper strata of Negro economic life. This group should, then, be more favorably situated than those usually studied for tuberculosis.

Two other groups of young adults have been studied with the purpose of finding tuberculosis. The students at a Southern college have been studied for two years. These students come from approximately the same areas as the students at Howard. A third group of young adults of about the same age is indigenous to Washington. These persons are not students but are employed by a government agency. No continuous study is being made of this group.

The total number of young adult Negroes studied is 2996.

THE INCIDENCE OF TUBERCULOUS INFECTION

At Howard University 1542 students have been examined. Of these, 991 were tuberculin tested and X-ray examinations made of the positive reactors. The average age of the men examined was 22.2 years and of the women 20.3 years. The tuberculin used was Purified Protein Derivative in two doses of .00002 and .005 milligrams.

Of the whole group 61.6 per cent showed positive reactions. Among the women 54.6 per cent were positive and among the men 68.6 per cent. The percentage of reactors increased with age as might be expected. It is interesting to note that the majority of the women fall in the 15 to 19 year group and that the majority of men fall in the 20 to 24 year ages.

In order to find out a little more about the students whom we were testing, the group examined during the past year was analyzed. Approximately one-half of the 475 students studied had previously been subjected to tuberculin tests and X-ray examinations, generally in high school.

A rough estimate of the allergic sensitivity of these students showed that 73 per cent of the positive reactors were detected with the first dose of Purified Protein Derivative and that 27 per cent were detected with the second dose.

To determine whether urban students alone would show a higher infection rate than the entire group, those students who were legal residents of the District of Columbia were studied. These students comprised 35 per cent of the entire group. The incidence of positive reactors was 57 per cent. This is statistically comparable to 61.6 per cent positives found in the entire group.

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†Assistant university physician and clinical instructor in medicine, Howard University.

The percentage of positive reactors found in this group is higher than previous figures reported for Negro colleges in the South.[1] The comparison with District of Columbia students who live in an area where Negro mortality was 240 per 100,000 in 1938 indicated an infection rate characteristic of urban dwellers.

Whitney[2] reports an incidence of positive reactors of 41.6 per cent in Negroes aged 15 to 19 years. Allowing for sectional differences our figure of 52.2 per cent for the same ages is roughly comparable to this figure for the general Negro population.

Comparison with the white college groups is difficult at best. The middle western colleges seem to have been most active in tuberculin testing. These colleges draw upon a large rural population which is not true of Howard University. Long and Seibert[3] report figures of 40 to 60 per cent for Eastern colleges. These figures indicate that the incidence of tuberculous infection in Howard University students is comparable to the rate of infection in Eastern colleges.

The Incidence of Disease

Examinations were made of 1542 students at Howard University, 999 students at College No. II and of 455 individuals in the non-college group. These examinations total 2996.

The examinations made in the second and third groups were mass examinations with the rapid paper X-ray method. Some of the upper classmen at Howard University were examined by this method, but the majority were examined by celluloid films taken following the tuberculin test. Medical students at Howard who are X-rayed each year are included. A number of upper classmen were examined because of contact, history of extrapulmonary tuberculosis such as pleurisy, or following acute respiratory complaints. For this reason, the figures for the incidence of disease do not indicate the amount of tuberculosis occurring in a totally unselected group. This is true only for the Howard University students. Statistically, the clinical suspects examined appear not to have affected the findings as reinfection tuberculosis seems equally prevalent in the three groups. Actually, the employment of other indications than the tuberculin test has yielded at least six cases which otherwise might have been completely missed because the students did not fall within the groups which we could afford to survey.

Results of this study showed that 127 or 42 students per thousand had some form of tuberculosis. Of these 85 or 28 per thousand showed reinfection type infiltrations not productive of physical signs, symptoms or laboratory evidence of their presence. These cases are designated latent apical tuberculosis. Students who manifested other evidence of disease beside that of the X-ray amounted to 42 or 14 per thousand. Of these, 10 per thousand were found to be manifest reinfection tuberculosis, exclusive of treated, apparently arrested, primary and pleural tuberculosis.

The latent apical forms of tuberculosis are of particular interest in this study because after only two years we have been able to demonstrate progression to the manifest stage by systematic X-ray follow-up and clinical supervision of these students. When it is realized that even a few of these lesions have progressed in spite of observation and an altered regime, the importance of asymptomatic tuberculosis is evident.

In the groups over which our control has not been as close as that in the Howard students the number of latent infiltrations which have quickly progressed to a fulminant manifest stage is appalling. More accurate estimates of the fate of latent lesions cannot be made at this stage. We can only infer that later observation will show them to be of extreme importance.

On the basis of a qualitative estimate of the X-ray appearance, it was found that 6 students per thousand had infiltrations of sclerotic or fibrous appearance which were adjudged apparently inactive, 10 students per thousand showed latent lesions of probable inactivity which were thought worthy of closer observation, and 12 per thousand were considered to have potentially progressive lesions. In other words, 23 per cent of latent lesions were thought to be inactive, 34 per cent to be of problematic status, and 42 per cent of a progressive type.

The manifest form of reinfection tuberculosis exclusive of treated and apparently arrested cases was found in 10 students per thousand as stated above. Eighty per cent of these were minimal in extent, 17 per cent were moderately advanced and 3 per cent far advanced. These figures almost exactly reverse the findings reported among sanatorium admissions in which 85 to 95 per cent of all cases are usually found in an advanced stage.

The qualitative nature of the infiltrations cannot be effectively discussed in the small number of cases found. It is sufficient to say that a little over 50 per cent were exudative in type. Approximately 16 per cent of the exudative lesions had progressed to cavity formation.

The influence of sex upon the incidence of manifest reinfection tuberculosis was studied. Almost four times as many women as men were found to have developed this form of the disease. Four manifest lesions per thousand males were found against 15 per thousand females.

Because latent reinfection tuberculosis develops into the manifest form, the ratio of manifest forms to all reinfection types discovered should indicate the tendency toward progression of latent lesions in any given group. A ratio of 1 manifest lesion to 6 reinfection forms in the male and a ratio of 1 to 2.5 in the female was found. A comparison of these ratios illustrates the fact that asymptomatic infiltrations are of great clinical significance in young Negro females but of not such great importance in males *at the ages studied*. This finding is stressed because asymptomatic lesions in these students are frequently ignored.

It is difficult to compare our figures for the incidence of disease with those of others because so many studies report only the clinically manifest types of tuberculosis.

Hetherington,[4] who reports all forms of reinfection tuberculosis, finds 50 reinfection forms per thousand in Philadelphia Normal College students. This finding may be compared to our finding of 40 per thousand. Bloch[5] attempting to identify "significant tuberculosis" reported in the literature and drawing upon his own experience estimates that between 5 and 10 manifest reinfection lesions per thousand are found in the larger colleges. This estimate is comparable to our figure of 10 untreated manifest reinfection forms per thousand. In the same article Bloch[5] also finds the reported incidence among Negroes in the general population to be 32 per thousand.

CONCLUSIONS

Comparison of our findings with those reported in the literature indicates that the incidence of tuberculosis in the groups studied may compare closely with the incidence in urban colleges. This seems to be true in spite of the fact that the economic status of the Negro students is lower than that of whites. The incidence of disease in Negro college students is less than that found in the general Negro population and in many groups of whites.

Although no effort has been made to compare the types of infiltration found in our study with those reported by others, the impression that all lesions in the Negro are extensive and rapidly progressive has not been borne out in our cases. The large number of latent and minimal lesions discovered indicate that tuberculosis may be discovered in early, easily treated forms by more intensive use of the X-ray among groups of Negroes. The fact that these lesions may progress more rapidly in Negroes than in whites is a potent argument for the more general use of the chest X-ray in apparently well individuals.

Our experience at Howard University has emphasized the need for follow-up of the infiltrations commonly regarded as minor which are found in the course of the usual survey. The mass method of chest X-ray is not fully utilized unless adequate provision is made for careful supervision of reinfection lesions regardless of symptoms, or other clinical indications.

There is great need for the extension of the mass X-ray examination to all groups of our population. The tremendous saving which would result from the more general use of this method among groups of young Negroes alone would soon be felt in a more efficient utilization of sanatorium beds and a lessened period of dependency for convalescents. It is obvious that a method which discovers 80 per cent of cases in the minimal stage, must lessen the need for expensive surgical care and in addition, make the problem of rehabilitation less acute.

BIBLIOGRAPHY

1. Cornely, P. B., Allen, E. H.: Am. Rev. Tuberc. 37:552-3, (May) 1938.

2. Whitney, J. S., McCaffrey, I.: Am. Rev. Tuberc. 35:602, (May) 1938.

3. Long, E. R., Seibert, F.: J. A. M. A. 35:281, 1937.

4. Hetherington, H. W., Israel, H. L., Krietz, P. B.: Am. Rev. Tuberc. 38:432, (Oct.) 1938.

5. Bloch, Francis, Eisele, Mason: Am. Rev. Tuberc. 37:186, (Feb.) 1938.

War Injuries of the Chest

Frank I. Terrill, M.D., F.A.C.S.
Deer Lodge, Montana

WHILE in civil life injuries of the chest are rather infrequent, in war, chest injuries are common. When we consider that the chest forms such a large and exposed part of the body, it is to be expected that injuries of this part frequently occur in combat—one in twelve war injuries involving the chest.

Because such vital organs as the heart and lungs are contained in the chest, this type of injury is apt to be of a serious nature. While the total mortality was 8 per cent in all types of war wounds, in chest wounds the rate was 56 per cent.

In this war, in addition to the ordinary war hazards there has been added the effect of high explosives. Zukerman has demonstrated with animals the results of these high explosives. He showed that the damage was the result of the blast wave and that the closer the animal was to the explosion the greater the damage. Autopsy on these animals revealed hemorrhagic areas in the lungs, especially marked along the anterior surface. If the animal was close to the explosion the whole lung was hepatized; intrapulmonary hemorrhage was present as well as superficial. He concluded that the lesions were the result of the impact of the blast wave rather than of changes in pressure.

Since it has been shown that the injury is due to the force of the blast on the chest wall, prevention is possible. A person in a raid should, of course, enter a shelter, if possible. If no shelter is present then protection can be obtained from lying prone in a ditch or gutter. It is better to lie prone because the back yields less to injury than the front part of the chest. Some measure of protection might be gained by covering the chest with heavy clothing or some type of sponge rubber.

The symptoms of injury might vary from a slight respiratory distress to a complete cessation of respiration. Shock is usually present and it should be remembered that often there is no evidence of external violence. Dyspnea and cough are often present. The most distinct diagnostic sign is hemoptysis, often evidenced by only a slight blood-tinged stain around the mouth or nose. Roentgenograph is valuable, if available.

In treatment the most important factor is to recognize the injury so that undue moving of the patient will not occur; that elective surgery will not be carried out; and, if surgery is demanded, that special care in anesthesia will be used. It is necessary to treat the shock which is always present. Complete rest is essential, but care must be exercised in the use of morphine. The most comfortable and probably the best position for transporting such a patient is with the shoulders elevated. Oxygen therapy is of value and should be used whenever possible.

In general it might be said that war injuries of the chest are much more extensive and severe than those encountered in civil life. In order to treat injuries of the chest intelligently, one must have first an adequate conception of thoracic anatomy and cardiorespiratory physiology. Other than the location of organs and vessels, it is necessary to understand the basic principle of respiration and especially the function of the so-called pleural space.

We know that on inspiration the chest is made larger by elevation of the ribs and depression of the diaphragm. Actually, the pleural space is not a real space but a potential one, the visceral pleura adhering to the parietal pleura by adhesion, similar to the action involved when two flat pieces of glass adhere to each other. This phenomenon is more marked if the glass is moist. Then, on inspiration the lung follows the chest wall as it enlarges and the air rushes into the bronchi to fill the expanded lung. Anything which destroys this adhesion of the pleural surfaces would cause the lung to collapse. This, of course, occurs when air is introduced into the pleural space either purposefully, as in artificial pneumothorax, or accidentally.

Common injuries of the chest are those involving the ribs. A simple fracture of a rib or of several ribs is usually a minor affair. If, however, the rib fragments have penetrated the lung, it is a serious matter and one which requires immediate attention, especially if a tension pneumothorax has resulted.

Tension pneumothorax might be produced by a spontaneous pneumothorax (rupture of an emphysematous bleb) or by any object which would penetrate or puncture the visceral pleura. As the missile tears the lung, bronchi (either small or moderate sized) are opened. There is a physiological contraction of the bronchial lumen on expiration and an expansion on inspiration. This is seen clearly on bronchoscopy. As the individual inspires, a gust of air is injected into the pleural space, and on expiration the air cannot reënter the bronchi because of its contracted condition in this stage of respiration. In this way, depending on the size of the rent in the lung and the number of bronchi open, a rapidly increasing pressure can occur in the pleural space. This must be relieved without delay, or it will be fatal.

A tension pneumothorax can be recognized by an increasing dyspnea and cyanosis. This cyanosis is apt to be more marked in the face and neck if the injury is on the right. On percussion the chest is extremely tympanitic and breath sounds are absent. If an X-ray is available the diagnosis is simple and the amount of tension is shown by the position of the heart and mediastinum.

Relief can be obtained by inserting a needle or a catheter into the pleural space, attaching a tube to either the needle or the catheter and placing it about 2 centimeters under water. If the opening is small, simple aspiration of the air might be all that would be required.

If a rib or a fragment has penetrated the lung it must be removed. An incision is made along the rib and the fragment is excised. The wound in the lung should be closed. The fractured ribs are held in place by pericostal sutures. Either no drainage should be carried out or the closed, under-water type used.

Simple fractures are only visible in the X-ray in 45 per cent of cases. Unless compounded, the treatment is immobilization of the chest with adhesive. In severe crushing injuries of the chest from an anterior-posterior direction, several ribs might be fractured front and back. This type of injury has been termed a "stove-in chest." Severe paradoxical breathing results and unless the chest is immobilized without delay death can follow.

Subcutaneous emphysema quite frequently follows penetrating lung injuries. It is startling when the condition becomes marked. Often the air under the skin will extend to the fingers and down even over the abdomen. Treatment is not usually necessary, but if there is considerable tension it can be relieved by placing aspirating needles into the subcutaneous tissues.

Fracture of the sternum occurs more frequently in war injuries than in civil life. The standard treatment of placing a sand bag under the back is usually sufficient, but open reduction might be necessary.

Hemorrhage from intercostal vessels must be controlled, as bleeding will often continue because of the negative pressure exerted by the pleural space. Vessels are easily ligated by making an incision over the rib and passing a suture around the rib and including the vessels. It must be remembered that near the spine the vessels are midway between the ribs and then quickly pass along the lower borders.

Hemorrhage from injury to the internal mammary arteries may be fatal unless controlled. The vessel is usually injured through small penetrating wounds and hemorrhage continues for the same reason as does hemorrhage from the intercostals. The arteries lie about three-fourths of an inch from the sternum and are exposed by excision of the costal cartilages and division of the posterior perichondrium. It is necessary to ligate the artery on both sides because of a rich anastomosis with the anterior intercostals.

Hemorrhage into the pleural space is of interest because of the various views on treatment. Hemorrhage into this space usually occurs from laceration of the lung but, of course, can occur from the intercostals or the internal mammary vessels. A curious finding is that blood in the pleural space does not coagulate. Many reasons have been given for this, but the curious fact remains.

During the last war the Italian surgeons advocated aspiration of the blood and replacement with air. This method lost popularity with the end of the war, but is again advised by the British. It has several advantages in that it (1) removes an excellent culture media; (2) the amount of blood being lost can be visualized by X-ray (a fluid level is visible when fluid and air are both present in the pleural space); (3) it has been claimed that it reduces the hospital time 50 per cent, and (4) calcification of the blood does not occur.

We have been advised that when the hemorrhage is only moderate in amount it should not be aspirated for two or three days because of the tamponade effect. The patient must be kept under close observation to detect continued hemorrhage. At the end of two or three days the blood can safely be aspirated. If the hemorrhage is rather marked, causing respiratory distress, and is not progressive, aspiration should be done and the aspirated blood replaced by air. If, however, the hemorrhage is progressive, open operation is indicated. Open operation is advised by some surgeons in all moderate-sized hemorrhages, but this is a radical viewpoint.

Transfusion is indicated if the hemorrhage has been large and auto-transfusion might be considered.

Early diagnosis of infection is essential so that careful attention to the aspirated blood is necessary. Many of these infections, especially if the lung has been lacerated, are due to anaerobic bacteria and the diagnosis of infection can be made by the odor alone.

Massive collapse or atelectasis may occur following injury, especially when the patient has been unconscious or when an hemoptysis has occurred. The signs are those of an atelectasis and the diagnosis is best made with a chest roentgenogram. Here we find the heart and mediastinum displaced to the affected side, which is opaque. The diaphragm is elevated and the rib spaces narrowed. A simple treatment is to place the individual on the uninvolved side and during a purposeful cough strike with the hand rather forcefully over the affected area. If this does not relieve the condition, bronchoscopy is indicated.

Most of the injuries to the heart are fatal, but occasionally, if the injury is not too extensive, good results can be obtained by surgery. Rupture of the heart is fairly common and is usually fatal. If either a penetrating wound or slight rupture occurs, signs of intrapericardial pressure can develop and it is possible to relieve this tamponade. The signs are those of circulatory embarrassment with (1) weak or absent heart sounds, (2) weak pulse, (3) decreasing blood pressure, (4) increasing venous pressure with prominent veins of neck and cyanosis of the face. If the diagnosis is made early and operation is possible the results are good.

Traumatic pericarditis can result from blows over the cardiac area and the symptoms will usually disappear in a few days, although occasionally they will persist.

Incised and lacerated wounds of the chest wall are not a problem and are treated the same as elsewhere, except on the back where all devitalized tissue must be removed carefully because of the rather poor blood supply in this region and the virulence of anaerobic infections.

In large sucking wounds where the pleura has been opened widely, the patient will rapidly develop respiratory difficulties and must be treated promptly to save his life. Such wounds when produced under anesthesia, for instance in lobectomy, do not cause the marked respiratory upset as when produced accidentally. Such a wound might be closed temporarily by adhesive over moist gauze. The tissues might be sealed by placing one hand over and one below the incision, pressing the tissues together and then holding with adhesive until proper repair could be carried out. Some surgeons have suggested the application of vaseline gauze over the incision to stop the sucking.

If the lung protrudes it is covered with gauze and not replaced until repair is possible. This often will prevent air being sucked into the chest with the serious respiratory difficulties encountered. If drainage is carried out, it should be of the closed type although usually none is necessary.

When the lung has been severely lacerated or injured, operation is indicated, but in small lacerations it is best to treat in a conservative manner. When a large bronchus has been opened, operation is also indicated and while repair is sometimes possible, lobectomy is almost always necessary. If hemorrhage from the lung is active a rubber-shod clamp or a lobectomy tourniquet is placed proximal to the bleeding, usually at the lobe root. Deep sutures are then applied at the bleeding point. Here, again, if a large part of the lobe has been severely damaged it might be necessary and easier to amputate the entire lobe. The opening in the chest wall is closed and usually closed drainage is instituted through a stab wound.

The problem of whether or not to remove a foreign body in the lung arises frequently in war injuries. In general it is best to treat conservatively and the decision is based on the size, shape, and location of the object. Usually, foreign bodies of an organic nature, such as rib fragments, should be removed. Smaller metallic objects, such as small bullets, are left in place unless symptoms are present.

In removal it is essential to localize carefully and this is done by means of X-rays taken in as many planes as necessary. If a Tomograph is available it is of value in determining depth. Open thoracotomy should be carried out and not the method of inserting a hemostat under the fluoroscope and searching blindly. Adequate exposure is necessary, the foreign body is palpated and, while compressing the lung manually, an incision is made radial to the hilus and the foreign body is removed. The incision is closed by interrupted sutures and unless a large bronchus has been opened no drainage is carried out. If infection is suspected, or is present, the same precaution in entering the pleural space as approaching an abscess is used. If the pleura is free a pack is inserted and left in place until the pleural space is obliterated so the foreign body can be reached without infecting the free pleura.

The incidence of infection is considerably higher in war wounds of the chest. It has been estimated that as many as 30 per cent of the severe chest injuries become infected. The value of the sulfa drugs in injuries cannot be questioned, but in infections of the chest cavity where the infection is due to anaerobic bacteria these drugs are of doubtful value. It has been our experience —as well as that of Graham and others—that following lung surgery, such as lobectomy and pneumonectomy, little effect on the empyemas which frequently result is obtained from the use of these drugs.

Inasmuch as infections of the pleural cavity play a major role in chest injuries, the treatment of empyema must be considered. Since the use of sulfa drugs in pneumonia, the complication of empyema has become very much reduced. The suppurative type of empyema which follows pneumonia is treated in a different manner from the putrid type which often follows injuries, lung operations, or rupture of a lung abscess into the pleural cavity.

In the suppurative type the operation can be delayed. Aspiration can be carried out until the fluid becomes thick, at which time the mediastinum is usually fixed. Then drainage is instituted and it does not matter what type of drainage (open or closed) is done, providing it is adequate and dependent.

Chronic empyema is a severe disease and one which requires radical and often repeated surgery, so that care must be exercised in the treatment of the acute stage to prevent its development. Practically all of the chronic cases are the result of placing the original drainage tube too high so that dependent drainage is not obtained, or the tube is removed too soon. The tube should be left in place until the empyema cavity has been obliterated. We prefer a combination of open and closed drainage for the acute empyema—a segment of a rib is resected and then the tube is inserted and sutured in place, and a closed, under-water or suction drainage maintained.

Putrid empyema usually follows a putrid lung abscess that ruptures into the pleural space, or injury to the lung especially when a large bronchus has been opened. The symptoms resemble those of a pneumonia. When a putrid empyema is suspected, aspiration should not be carried out and if a diagnostic aspiration is necessary and putrid pus found, open operation must be carried out at the time of aspiration. Putrid empyema is the result of an anaerobic infection which is virulent, and this infection will follow a needle tract with spreading necrosis of the tissues which almost always results fatally.

In contrast to the suppurative type of empyema, the putrid type should be operated upon as soon as the diagnosis is made. Here the open type of operation must be done and sutures are avoided, if possible. A large type of drainage tube is used so that adequate drainage is obtained and so that the closed pleural cavity is converted into aerobic conditions. Frequently the pus found is thin and often remains of this character, so that operation should not be delayed in the hope that the pus will thicken and the mediastinum will become fixed.

The odor of the pus is characteristic and the diagnosis of a putrid empyema can be made from this alone. It is not necessary to wait until the laboratory reports anaerobic bacteria present to make this diagnosis. Because of the virulence of this type of infection, treatment must be carried out promptly and correctly if the patient is to be saved.

Conclusions

In treating injuries of the chest, most emphasis should be placed on:

1. Tension pneumothorax.
2. Hemorrhage.
3. Sucking wounds of the chest wall.
4. Infection.

Proper treatment of these four conditions will greatly reduce the mortality.

Emergency Treatment of Fractures*

Stanley R. Maxeiner, M.D.
Minneapolis, Minnesota

ACCIDENTS have been steadily on the increase in both the city and the country, as a result of intensified industrial, automobile, farm, and home activity. While paved roads and automobile speed have added greatly to the number of accidents occurring in rural communities, the advent of gasoline, tire, and car rationing will probably prevent many of these motor accidents. However, since the United States has entered the war, on both our east and west coasts there is the constant menace of bombing or shelling which might precipitate a deluge of accident cases upon all of our hospitals, and the public has become accident conscious. Although there is considerably little likelihood because of our geographic location that we will be subject to such shelling or bombing, there is nevertheless great activity in civilian defense preparedness and the layman is being taught first aid through the agency of the Red Cross and local medical societies. Thousands of laymen are learning how to care for minor accidents, how to control hemorrhage, and how to apply splints. They are also being taught that certain accidents will permit transportation of the patient by car while the severer cases, especially those with fractures, must be transported, after splinting, in a reclining position.

The writer recently experienced a two-hour black-out in Los Angeles and conversed with the doctors and wardens, both in Los Angeles and San Francisco, regarding the methods of preparedness. In San Francisco a bombing raid alarm was given. Wardens and lay persons patrolled the streets where many hypothetical injury cases were supposed to exist. During this preparedness trial, children feigned unconsciousness upon the streets and other persons bore tags that they had received a compound fracture of the leg, a head injury, a chest or abdominal injury, or had been severely burned. The first aid wardens and their colleagues were required to state the type and procedure of first aid which should be rendered and to what hospital the patient should be transported. Doctors with operating teams stood in readiness in the hospitals and they, with their hospital attendants, went through the routine of attending a large number of victims. The drill was a great success and many other communities throughout the United States are fashioning their preparedness efforts with similar plans.

According to statistics prepared by Love[1] at the close of the last World War, casualties of the United States Army showed 54 per cent were soft part wounds of the extremities, 29 per cent were compound fractures of the extremities, and 9 per cent involved the head and spine. The accidents of civilian life and industry present even a higher percentage of fractures which should be of the utmost concern to every doctor called upon to render treatment.

Medico-Legal Aspects

Because of the fact that a very large percentage of malpractice suits are based on the treatment of fractures it seems wise at this time to call attention to the position of the physician and his obligation to the patient when he attempts to treat a fracture. The end result of fracture treatment is obvious and the attorney for the plaintiff is apt to present a bad result to the court as neglect or failure of a doctor, regardless of the severity of the original injury. When a physician takes over the care of a patient a contract is immediately implied to exist and this contract does not end until the dismissal of the doctor or conclusion of the patient's treatment terminates it. A doctor becomes liable if he abandons a case during treatment. A recent case in Minnesota establishes this fact when judgment was rendered against the physician who had called an ambulance to attend a charity case for transportation to a county hospital. In this instance the physician did not remain with the patient until the ambulance arrived, the patient died, and the doctor was held in neglect.

The New York Court of Appeals rules, "A physician and surgeon by taking charge of a case, impliedly represents that he possesses, and the law places upon him the duty of possessing, that reasonable degree of learning and skill that is ordinarily possessed by physicians and surgeons in the locality where he practices, and which is ordinarily regarded by those conversant with the employment as necessary to qualify him to engage in the business of practicing medicine and surgery. Upon consenting to treat the patient, it becomes his duty to use reasonable care and diligence in the exercise of his skill and the application of his learning to accomplish the purpose for which he was employed. He is under further obligation to use his best judgment in exercising his skill and applying his knowledge."

He must also keep abreast of the times and must not depart from methods in general use. Reasonable is applied to the degree of learning and skill and ordinary is applied to the skill and learning of the physician in the locality where he practices.

In order to establish malpractice, the plaintiff must prove:

1. That the physician actually treated the patient.
2. That the physician departed from some duty owed by him to the patient.
3. That the departure caused the injury or bad result complained of.

The mere fact that a doctor is licensed to practice establishes the fact that he possesses the requisite skill and it is very hard to prove that he did not use his best judgment; therefore, it is usually claimed that he did not use care and diligence or that he departed from approved methods in general use. It is usual to exhibit the poor result and let it speak for itself. This poor result, however, is no evidence of malpractice inasmuch as the result obtained may be an excellent result, both anatomical and functional, when one considers the gravity of the original injury. However, one must be extremely watchful lest he obtain malposition or malfunction, the result of improper reduction or the use of improper or unaccepted methods of procedure.

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*Presented before the North Dakota State Medical Association annual meeting, Jamestown, May 20, 1942.

It is not uncommon for a fracture patient with a faulty union to proceed to the office of another physician who makes an improper statement to the effect that this is a rotten result, that he could have done better, that the physician in charge should have done better, or that the case represents neglect or improper treatment. Any such statement to a patient, his family, or his friends is invariably a stimulus to the development of a suit for malpractice.

It is extremely important that any physician attending fractures keep thorough and complete records: where the patient was seen, a case history of the accident, a thorough physical examination, and a complete and painstaking record of prescribed treatment. The writer has on several occasions, as a member of the record committee in Minneapolis hospitals, noted the fact that on entrance to the hospital a surgical operation was performed, that sutures or drains were introduced and that a cast or splint was applied. Insofar as the follow-up records of these patients are concerned, it would be impossible to state whether, before discharge from the hospital, the sutures and drains had been removed and whether the patient wore the cast and splints home, or had been removed in the hospital. With such incomplete records it would obviously be impossible to put up an adequate defense in a malpractice suit. Records should be maintained of contributory negligence on the part of the patient such as persistent obtaining of drugs or liquor from his friends during the course of treatment, wilful alteration of splints or dressings, or wilful failure to report for treatment. Under such circumstances, our office has made it a routine procedure to send each of these patients a letter calling attention to his contributory negligence, and a copy of this letter is kept in the patient's file for our protection.

In estimating the value of an end result one must attempt to prove to the court the fact that an X-ray appearance or anatomical reduction is not nearly so important as a good functional result. I recall a series of fractured femurs demonstrated before the Minnesota State Medical Association by Dr. Colvin of St. Paul in which the X-rays of the patients were first shown and in none was there an end-to-end apposition of the fragments. In some there was even a moderate amount of bowing but in all of the cases the return of function was essentially normal.

Transportation of the Injured

A careful examination by the physician or even the first aid student should be made at the place of accident. A patient who is in severe shock, is unconscious, or has a flail point of fracture can be deprived of his chance of saving an extremity or even his life by bundling him into an automobile. If he is in shock, has a head injury or suffers pain in the neck and spine with elevation of the head or shoulders he should be transported by stretcher in the reclining position. In the presence of a fracture and shock the patient should be covered with robes and kept warm while the extremity is splinted before transportation. During the last World War statistics of the British Army show that mortality in compound fractures of the femur was reduced from 50 per cent to 15 per cent by the application of Thomas splints by lay stretcher bearers.

It is obviously impossible for us to prevent the primary trauma which a patient receives during an accident but it is equally obvious that we can prevent secondary trauma and even the compounding of a previously simple fracture as the result of improper transportation of seriously injured patients with unsplinted fractured extremities. In military practice practically every stretcher bearer or soldier assigned to the first aid squadron is taught how properly to apply a Thomas or Jones traction splint. In civil practice a first aid student can be taught to apply fence boards with notched ends over which traction cords or bandages attached to the extremity by a clove-hitch may be secured and traction maintained during transportation.

In Minneapolis I know of several physicians and a railroad surgeon who always carry in the trunks of their cars first aid equipment consisting of arm and leg traction splints, sheet wadding, a few wooden splints, sterile dressings, bandages, etc. I believe it is equally important in the case of physicians in rural communities to be similarly equipped. An ordinance has recently been passed by the Minneapolis City Council which requires all ambulances to have such equipment and at least one attendant on all ambulance calls is required to know how properly to apply first aid and transport a recent injury. A similar measure introduced before the State Legislature was voted down by those in rural communities who operate vehicles for transportation not exclusively ambulances. Firemen and police in New York have been trained in the care and transportation of the injured, and movies demonstrating their first aid technic have been indorsed by medical societies, including the American College of Surgeons. They have been frequently exhibited before medical groups, parent-teacher associations, etc., with excellent results. Boy Scouts and many factory employees have had similar training. Only last week a woman, 87 years of age, fell while returning home from church. She was first transported to the Y.W.C.A., then by automobile to her home and finally by ambulance to the hospital where it was found that she had a fractured hip. A little lay education would have prevented such undue suffering. In rural communities a physician is called upon to treat accident cases in the home or on the farm and he must be adequately prepared to render first aid or permanent home care. Many physicians treat minor fractures in their offices but we believe that all major fractures should be hospitalized.

THE PURPOSE OF TREATMENT

The purposes of treatment are:

1. Preservation of life.
2. Preservation of limb.
3. Restoration of function in the shortest possible time.

Special care must be afforded the aged, the alcoholic, and the poor surgical risk. The aged, while awaiting transportation, must be protected against the cold and during transportation must be guarded against the chill of an open car. First aid attention must often be delayed until strength has been regained in these cases. One must be constantly alert that alcoholism does not confuse the picture of unconsciousness due to fractured skull, concurrent disease, or serious thoracic or abdominal injuries. Many accidents are sustained by people in the poor risk group suffering from anemia, diabetes, or exhaustive disease and their care must often be supplemented by attention to their general condition.

Shock often results from severe bodily injury. It is characterized by rapid pulse, pallor, shallow respiration, a fall of blood pressure, and cold or clammy skin. Many of these patients have sustained multiple injuries, the least severe of which may be a fracture of the extremity. In emergency hospitals, shock treatment comes first. In many of these, there are shock wards where the patient rests quietly in bed while the foot of the bed is elevated; external heat is applied, and large doses of morphine are given. Captain Hook states that the primary dose of morphine as rendered by the Navy is one-third grain and more is given subsequently when necessary. This same experience prevails among the British forces. A case record of the pulse and respiratory rate is kept, together with frequent blood pressure tabulations. Infusions and transfusions are given. The use of glucose solution and blood serum is adequate except where there has been extensive hemorrhage and here whole blood transfusions which also replace the cell loss are of greater benefit.

Head injuries and abdominal or thoracic injuries may be of the greatest importance and so severe that they demand attention before treatment of fractures of the extremities may be considered. I recall a former patient who had fallen from a considerable height, sustaining a ruptured spleen together with a compound fracture of the forearm. The patient was in extremis because of massive intraäbdominal hemorrhage. This patient's condition of course demanded multiple transfusions and splenectomy before attention could be turned to the fracture of the forearm. Another patient who fell 60 feet down an elevator shaft sustained the only bona-fide traumatic strangulated hernia that I have ever seen. He was transported by ambulance 150 miles. Emergency relief for the strangulated hernia was essential before fractures of the spine and os calces could be reduced.

CHOICE OF ANESTHETICS

As soon as the reduction of the fracture is contemplated, one should give very careful study to the choice of the anesthetic. Ether, nitrous oxide and ethylene, spinal, local, and sodium pentathol are all available in the average hospital today. In the hands of skilled anesthetists, nitrous oxide and ethylene are probably the safest. Open ether is undoubtedly better in the hands of a poorly trained anesthetist. Spinal lends itself admirably to fractures of the lower extremity in the good surgical risk. Pentathol is popular at the present time but must be used with great caution. Local anesthesia in our opinion is still the safest for the bad surgical risk.

In severe crushing injuries of the extremities demanding amputation, the delayed tourniquet amputation may have a specific application. I have in mind a debilitated man of 78 with compound fracture and mutilation of tissues of the leg with loss of main vessels and nerves. Immediate amputation would undoubtedly have been fatal but by the use of a tourniquet for several days the patient's condition rallied so that amputation was safely performed under local anesthesia.

After the patient has safely arrived at the hospital and a careful history of the nature of the accident has been obtained, he should be very carefully examined for signs of injury to the head, and for possible fracture or brain injury. Examination of the chest should be made, especially in the presence of spitting of blood, embarrassed respiration, or hemothorax, and the abdomen should be examined for hemorrhage or perforation. The spine should be carefully checked for possible compression fracture and if movement of the neck, thoracic, or lumbar spine is painful, X-rays should be routinely taken even in the absence of demonstrable deformity.

EXAMINATION OF THE INJURED EXTREMITY

One should examine carefully for deformity, for breaks in the overlying skin and for crepitation or other signs of fracture. A most painstaking examination should be made to determine the integrity of the nerves, blood vessels and tendons. A spike from a comminuted fracture not infrequently lacerates an important vessel so that it must be ligated or sutured in order to preserve adequate supply to that part of the extremity distal to the injury. By some of the newer methods the artery may be sutured, anastomosed and in some of the war hospitals, gelatin tubes, rubber tubing and grafted vessels have permitted maintenance of the main blood supply until collateral vessels have had an opportunity to compensate. It should be borne in mind that frequently the ligation of a main artery should be accompanied by ligation of its accompanying vein to give the best results. Nerves may be torn or severed and should be reunited. Tendons close to comminuted fractures or fractures with great displacement may be torn from their attachments or divided and their anatomic restoration is essential for the return of function. X-ray examination by the use of a portable machine saves moving patients.

TREATMENT OF THE FRACTURE

In the absence of severe bodily injury, shock, etc., we consider fractures an emergency and attempt to treat them promptly, day or night. Many methods of treatment at present are in vogue and it would be impossible for me to go into great detail as to individual methods of treatment and the technic of treating individual fractures. As a result, I must confine myself to generalities such as:

1. *Manipulation and splinting*. Simple fractures of the ankle or the wrist and many others lend themselves to reduction by simple manipulation and when reduction is completed, splinting with metal, wood, or plaster must be left to the judgment and experience of the individual surgeon.

2. *Traction* in suitable appliances should be used in fractures, particularly of the humerus and the femur, or fractures of both bones of the leg or arm. Those fractures in which muscle pull causes shortening or slipping of the fragments will frequently lend themselves to weight and pulley traction in a Thomas or Jones splint whether by the use of skin traction or skeletal traction. One must be, however, extremely guarded in the treatment of any fracture with traction so that the weights remain properly adjusted, that counter traction against the upper end of the Thomas splint does not produce tissue necrosis and that too great traction or too long continued traction does not cause the development of nonunion.

3. *Open reduction* in certain selected cases is quite essential. Where manipulation or traction has failed to secure adequate reduction or where there may be intervening tissue between the ends of the bones or in the presence of severe hemorrhage or divided and lacerated tissues, open operation, reduction, and internal fixation of the fracture should be performed. The Parnum band and circular wire are not considered especially good since the mere fact that they encircle the bone interferes with blood supply and development. Campbell states that 95 per cent of fractures can be treated by conservative methods but because of the greater demand for anatomic and X-ray perfection, there is a growing insistence in many sections upon open operation which theoretically hastens the convalescence and lowers hospital costs in certain cases. Indiscriminate open operations, however, should be condemned. The indications for surgery may be briefly stated. Such would be the interposition of tissue, the displacement of fragments by reflex contraction of muscles, the constant motion from inability to fix fragments securely, and failure of reduction by mechanical forces such as leverage, traction, pressure, etc. Open operation may be necessarily delayed for two weeks or more to heal abrasions and blebs which might be sources of infection.

Compound Fractures

It is imperative that the treatment of all compound fractures start at the place of injury. The wound should be covered with a sterile dressing, temporary tourniquet applied for massive hemorrhage and the extremity properly splinted for transportation. If the bones are penetrating the skin, they should not be drawn back through the skin. All compound fractures are best treated in the operating room of a well equipped hospital.

Technic of Treatment

Granted that the patient's condition warrants operation, he is given a carefully selected anesthetic. The wound is covered with a sterile dressing and the skin over a wide area approaching the wound is thoroughly scrubbed with soap and water. The wound itself is thoroughly cleansed and irrigated. The best cleansing is undoubtedly by mechanical irrigation with the complete avoidance of antiseptics which tend to destroy the vitality of tissue which has lowered resistance. Those compound wounds which are seen within six to eight hours after the accident are classed as contaminated wounds and the delay of every hour increases the chance of infection. Any tourniquet placed on an extremity should always be released at regular intervals so that the member may not be permanently destroyed. The use of cotton swabs with continuous irrigation and picking out and removing fragments of sand and foreign bodies should be supplemented by irrigation of the depths of the wound by the use of a nozzle or catheter. In this manner the flow of the irrigation is from within out and helps to flush out rather than wash in contamination. A meticulous debridement should follow the mechanical cleansing. Ragged wound edges are excised. Devitalized muscle tissue is recognized by its grayish color, its absence of contractility with mechanical stimulus or its shredding and partial detachment. All muscle and fibrous tissue which gives evidence of lack of viability should be removed due to the fact that anaerobic and saphrophytic bacteria and, likewise, pyogenic organisms, thrive on such media. It is not uncommon in war injuries, due to flying fragments, to find clothing, soil, etc., carried into the wound by the fragment. All of these with loose and detached bone fragments should be carefully removed.

I recall a personal friend of mine injured in an automobile accident in which the knee joint was torn open and the patella fractured, with loose fragments of clothing found in the knee joint. The patient was treated by mechanical irrigation, debridement and primary suture of the joint with primary healing and 100 per cent restoration of function.

At the present time there seem to be two definite and distinct schools. The first recommends primary suture of the wound when a mechanical cleansing and debridement satisfactory to the surgeon can be accomplished and the second advises packing open all compound fractures, preferably with vaseline gauze. When the surgeon is in doubt as to the complete sterility of the wound, he may do a delayed primary suture five to six days after treatment of the wound. This method of treatment is good, as by this time one can determine definitely which are and which are not infected wounds. In those cases so treated within the first six hours, nerves and tendons should be anastomosed when injured and the fracture should be reduced under vision and held securely by internal fixation with bone plates or wire. Venable has shown that with the new alloys, Vitallium plates and screws placed across the line of a suppurative compound fracture will hold the fragments in apposition and in many instances become completely healed even in the presence of severe suppuration. Babcock has demonstrated that his alloyed wire does not act as a foreign body and will remain completely buried in the tissues of a wound such as occurs in the drainage of suppurative appendicitis.

One of the greatest discoveries of recent years has been the sulfonamide drugs. After a wound has been mechanically cleansed and thoroughly debrided, one of the sulfa drugs is spread over the depths of the wound between the fascial planes and around the point of fracture. Early administration of this same group of drugs per orum or subcutaneously aids to hold any infection in check. It has been shown beyond question that the sulfonamides are not a substitute for debridement and mechanical cleansing because those wounds which have been treated under careless surgical technic, with reliance upon the sulfonamides, have been found to suppurate. In one of the major hospitals the absence of infection in compound fractures with one group of surgeons was noticeably better than with another group who did not do a careful debridement. In a small group of compound fractures at the Minneapolis General Hospital before the advent of sulfonamides, I personally was able to secure primary healing of fracture wounds in 75 per cent by the use of mechanical cleansing and debridement alone. It has been recommended that during the surgical treatment of compound fractures small fragments of tissue be incubated, anaerobically and aerobically, to determine the presence and nature of contaminating organisms. In compound fractures, as with simple fractures, splinting, fixation, and postoperative care are of equal importance. To summarize the treatment of compound fractures one could do no better than to quote Moorehead[2] on the treatment of war wounds.

Thus to sum up, we treat war wounds in terms of: (1) time, (2) soap and water cleansing, (3) debridement, (4) primo-secondary or no suturing, (5) sulfonamides locally and internally, (6) adequate dressings, (7) careful re-dressings, (8) blood for shock and infection, (9) no secondary incisions except for localization, (10) debridement, sulfonamides and X-ray for gas gangrene, and (11) antiserum for tetanus.

ANAEROBIC INFECTIONS

The United States Naval Academy now immunizes all cadets with a tetanus toxoid. As a result, tetanus in this group of fighting men should be nil. Among civilians, tetanus may follow any compound injury. The universal use of prophylactic antitetanus serum should accompany all compound fractures. Tetanus is best treated by its prevention and in the British forces the serum is often repeated six to ten days after an injury. When tetanus has once developed, statistics show that the present treatment of tetanus is little or no better than that which prevailed before the advent of serum. Those cases with a short incubation period are fatal while those with a longer incubation period may recover.

Gas forming organisms likewise are prone to be found in compound fractures. The British Council recommends the use of a combined gas bacillus serum consisting of 3000 units cloistridium Welchii, 1500 units cloistridium septique and 1000 units of cloistridium œdematicus. During the early years of the first war, gas bacillus infections were not early recognized and many lives and limbs were needlessly sacrificed. At the present time early recognition of a gas bacillus infection is possible. It is characterized by rapid increase in pulse, high elevation of temperature and greatly increased pain in the extremity. X-ray examination frequently reveals gas between the fascial planes. Serum and incision, early drainage, open dissection of the fascial planes and removal of muscle tissue which fails to show mechanical reaction is adequate treatment in most instances. X-ray treatment is advocated by many and questioned by an equal number of others. We have on one occasion treated successfully a patient referred to us in extremis with gas bacillus gangrene by the tourniquet amputation when we were convinced that any type of surgery would have been fatal.

I would summarize briefly that in the treatment of all fractures (1) the attending surgeon should guard himself against malpractice by adequate records and standardized treatment, (2) first aid be given at the place of injury, (3) fractures be properly supported and splinted for transportation and (4) compound injuries be treated in the most approved manner to avoid wound infection.

BIBLIOGRAPHY

1. Darrach, William: Fractures Sustained in War, Am. J. Surg. 56:341-342 (May) 1942.
2. Moorhead, John J.: War Wounds, Am. J. Surg. 56:341-342 (May) 1942.
3. Venable, Charles S.: General Aspects of Automobile Injuries, So. Med. J. 32:56-59 (Jan.) 1939.

The Treatment of Anterior Poliomyelitis*

John D. B. Galloway, M.D.
Minneapolis, Minnesota

THE treatment of anterior poliomyelitis in the past has not been of the best which is evidenced by the many patients that come to the Orthopedic outpatient departments and hospitals for corrective treatment. Last year (1940), 140 of the 604 admissions at The Gillette State Hospital in St. Paul and 45 of the 186 admissions at The Shriner's Hospital in Minneapolis received corrective treatment for poliomyelitis. Since this disease is responsible for many of the crippling defects seen in practice, it is felt that a review of the treatment of anterior poliomyelitis is well in order.

The course of this disease is divided into three stages, namely: the acute, the convalescent, and the chronic stage, the latter being frequently designated as the period of permanent residual paralysis or the reconstruction period.

The acute stage extends from the onset of symptoms to the disappearance of muscle pain and tenderness, which lasts anywhere from one to six weeks. The treatment prior to the onset of the paralysis is entirely systemic in nature, and while waiting for the laboratory reports of blood, spinal fluid, etc., the patient should be isolated in a quiet environment and kept at absolute rest in bed. Sedatives may be necessary for restlessness and irritability; any other therapeutic measure may be included as indicated. Of course good nursing care is essential and important. During this stage, convalescent sera, poliomyelitis antistreptococcus sera, or whole blood transfusions may be given if desired. However, there has been very little proof in the past that any of these do much good. I do believe though, that of these several agents, Dr. Rosenow's poliomyelitis antistreptococcus serum offers the best protection against the appearance of any subsequent paralysis, and probably should be used more often. The sulfonamide compounds have been used with little or no effect and as Rosenow and others have shown, these drugs seem to increase the central nervous system irritability because of their toxic affinity for this type of tissue.

The paralysis may occur rapidly as in the bulbar type, or after about forty-eight hours, which is usual, for the spinal type. If the paralysis does not occur within eight days, the diagnosis of poliomyelitis, as a rule, can be excluded. In some no paralysis occurs as in the abortive; in others the paralysis or muscle weakness is so slight or so localized that it is not apparent until later when some muscle imbalance and perhaps deformity is seen. Frequently older children and young adults present typical postpoliomyelitic deformities in whom the diagnosis of paralysis was never suspected until seen at the time of examination. Therefore, children who are suspected of having had an attack of this disease, and who, at the time of their illness showed no apparent muscle involvement, should be checked from time to time to determine if any weakness is developing.

During the acute stage institution of proper treatment is of the utmost importance and patients require intelligent handling and supervision, for it is during this period that the foundation for many a deformity is laid because of lack of adequate care. Therefore complete rest with expert nursing care and suitable support is essential. No attempt at muscle testing should be carried out at this time, but by gross inspection only the affected parts are noted and protected. If it is doubtful whether one or more parts are affected they should be treated as though they were involved. If it is discovered later that a limb is normal no harm has been done, but, on the other hand, overstretching of the paralyzed muscles and shortening of the good muscles may occur and we know that this stretching sets back the ability for restoration out of proportion to the period of time lost without protection.

By adequate protection is meant the splinting of the affected part in a neutral position, which for the body as a whole is as follows: patient should be placed supine, preferably on a Bradford frame. A frame can be made of about ⅜- or ¾-inch pipe or wood with a sheet or canvas spread tightly across and with an opening in the region of the buttocks. The frame is elevated on blocks to allow use of a bed pan without disturbing the patient. A pillow is placed under the buttocks and removed as necessary. The frame should be long enough to extend beyond the head and feet and wide enough for comfort. Straps, sheets or towels are applied to prevent patient from rolling or twisting. If this is not available, boards should be placed between the mattress and springs and a thin pillow put under the head and shoulders, or the mattress can be elevated slightly from the hips upward. The head and neck should be in such a position that the chin is pointing forward.

The arm is held in 75 degrees abduction, half-way between external and internal rotation; the elbow is flexed to 90 degrees with the forearm half-way between pronation and supination. The wrist is in slight extension with the fingers relaxed like the normal hand when it hangs by the side. The hips are slightly flexed and abducted. The legs are held mid-way between external and internal rotation with the knees flexed about 10 to 15 degrees and the feet at 90 degrees to the legs and slightly inverted with the toes straight.

There are many different ways to maintain this neutral position. In some instances it may be impossible at first to obtain splints, so while waiting the body can be supported by pillows, folded towels or blankets. The arms can be held in abduction by applying slings fastened to the head of the bed. It is quite difficult here to keep the arm half-way between external and internal rotation, so the next best is to allow the arm to lie in slight external rotation with the forearm supported on a pillow. The knees can be flexed on a folded towel or a small pillow. The feet can be held at right angles by placing a board across the foot of the bed or by packing pillows or blankets between the foot of the bed and the soles of the feet. It is important to apply a more permanent type of splint as soon as possible. Splints can be easily made by using heavy wire or coat hangers fastened together with adhesive or soldered together and then bent to fit the extremity. They should be covered, using canvas, musline strips or stockinette and padded with sheet wadding, felt, eider down, sponge rubber or the like. Another method is to make splints of metal, such as aluminum or galvanized iron, in the form of a trough, padded and covered with leather, or in young children with some type of waterproof materials such as oiled silk. Improvised splints can also be made out of any type of light wood and adequately padded.

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*Read before the Stearns-Benton County Medical Society, March 20, 1941.

Dressings of plaster of paris may be applied in the form of circular casts which are bivalved later for treatment, or padded plaster splints may be used. Plaster is an excellent way to support the paralyzed part, but if the child is quite nervous and muscles are very sensitive the excitement of applying such a support might be too much for this patient. If there is any danger of fatigue by putting on casts it should be reserved for a later date when the patient is in better condition. If it is necessary to transport the child to a hospital to put on plaster casts and this cannot be done without the element of fatigue entering, it would be better to use some other method of splinting for the time being. Where there is marked generalized paralysis, less support is required to maintain the neutral position. Where there is less extensive involvement but greater muscle imbalance, this is then the best indication for applying casts of plaster of paris. Another disadvantage of plaster casts is that they cannot be altered from time to time to maintain neutral position like a wire or gutter type of splint. Therefore the type of splint to be applied during this stage should depend upon the circumstances in each individual case under treatment.

During the acute stage heat, in the form of hot packs or infra-red lamp, may be used to relieve the pain and tenderness of the muscles. If the child can be placed in a hot bath daily without the danger of fatigue or muscle stretching it is of value. Hot packs if used should be wroung out until completely dry before applying. This is best accomplished by running the pack through an ordinary clothes wringer. Bladder and bowel weakness, which frequently accompanies weakness or paralysis of the lower abdominal and back muscles, should be watched for during this time. For the sluggish bowel, lubricants and gentle flushings should be used. Bladder control usually returns within a week at the most but distension should be combated with very careful catheterization.

If paralysis of the primary respiratory muscles occurs patient should be placed in a respirator as soon as possible. Adequate support and nursing care is difficult in a respirator, and thus the patient should not be kept under this form of treatment longer than is necessary. However, removal from the respirator should be carefully considered, for a secondary collapse due to fatigue may occur. Respirators can also be used as a means for training the patient towards normal muscle power and balance. If a respirator is not available and patient has to be transported a long distance it probably would be better to keep him at home and as quiet and as free from excitement, exertion, and apprehension as possible.

Now we come to the convalescent stage which lasts from about one month to two years.

Muscle sensitiveness and pain have now disappeared and a detailed muscle examination can be completed. This should be done very carefully and by one trained in the work. These examinations are repeated from time to time and should be done by the same person each time. A record is kept of each examination in order that an intelligent estimation of the course of treatment can be tabulated. It is the result of these tests that determines future treatment and prognosis.

During this stage daily application of heat is continued and in addition massage and exercises are started. Intense heat, prolonged heat, or large doses of diathermy are contraindicated. Ten to fifteen minutes for each extremity or part is sufficient. Massage must be of a mild type and is of a light stroking nature carried out for not more than four or five minutes for each extremity at the beginning. Light stroking massage over too long a period of time will relax the muscles too much. Deep massage over too long a time will produce fatigue. These procedures are lengthened in time as the part improves and are increased as the muscle strength and power increase.

Exercises, if not properly given, will produce more harm than good. As we know, deformities are produced by muscle imbalance, therefore, we treat the weak muscle only and neglect the strong. If all muscles were subjected to the same treatment so that maximum strength occurred in each, then muscle imbalance would take place with subsequent deformities. These exercises are usually given the first thing in the morning after a good night's rest. The extremity is placed on a well powdered board and the exercises carried out as indicated. They are carefully graduated according to the strength of the muscles and not until these structures have regained at least 60 per cent of their normal strength is full range of motion allowed. Each extremity is treated separately. If too many muscle groups are involved so that fatigue occurs before all have been treated, then only one group at a time is treated and later on in the day the remaining ones are exercised. In the beginning full range of motion is not permitted. If opposing groups of muscles are affected a few degrees of motion are allowed in both directions. For the most part the following schedule should be observed: if muscle power varies from 0 to 10 per cent of normal, only setting exercises three to five times daily are permitted. When the muscle power is 10 to 50 per cent of normal, active assistance exercises through 20 to 50 degrees of motion four to six times a day are permitted. When muscle strength is 50 to 70 per cent of normal, active assistance exercises are allowed through full range of motion providing the opposing group has over 50 per cent of normal power. When there is 70 to 100 per cent of normal power, resistive exercises are carried out through full range of motion provided opposing groups have over 50 per cent of normal power. While doing these exercises it is important to guard against substitution by the strong or normal muscles, for example: weak hip abductors may be replaced by the action of strong lateral abdominals and thus the abductors are actually being stretched. Substitution can be overcome by starting the exercise from the neutral position and by a little assistance, or by changing position, substitution muscles may be kept from acting.

It is important to remember that, while extremities are out of their supports during treatment, they should be kept and maintained in a neutral position at all times. This can be accomplished by using blankets, pillows, blocks, etc. Patients are also taught how to protect and support their muscles when supports are removed.

During the past few years thousands of dollars have been spent in the erection of swimming pools and hospitals where patients are treated for poliomyelitis by means of hydrotherapeutic measures. In the hands of experts much good has been accomplished, but for the most part the results of such treatments are rather disappointing. In early cases the actual muscle power usually becomes less while the functional ability may gain. It is felt now that water therapy has no place in the treatment of the early cases. While in the water it is difficult, due to the buoyancy of the water, to fix the body while treating a certain part; substitution of the relaxed muscles readily takes place which predisposes to deformity and contractures. Fatigue also occurs more readily without the patient's knowledge with subsequent stretching of the paralyzed muscles. The localization of exercise is more difficult and the ligaments and joint capsules may be stretched and weakened to a dangerous point. Protection is the most important factor in the early cases; thus if the patient is allowed in the pool with adequate non-corrodible braces, the patient may be so encumbered that the effect of the water buoyancy is lost. However, if the weight bearing muscles have regained 70 per cent of their power, walking in water is an excellent way to start activity without danger of strain. After the first year or so, if extremities can be adequately braced, under water exercises are of great general benefit. In the chronic cases substitution is sometimes desirable provided deformities do not develop for this improves the functional ability of the extremity. Thus in these cases under-water-therapy is of value. This type of treatment also seems to have a good mental and general physiologic action upon the patient.

In patients with very cold extremities treatment with the suction-pressure boot has proved to be of some value. Here too the danger of fatigue must be guarded against and the treatment must be strictly supervised.

Electric stimulation of the involved muscles has not proved to be of much value in the past and in many instances has done more harm than good. The injudicious use of this treatment is therefore to be condemned.

Occupational therapy is gradually taking its rightful place in the rehabilitation of these patients. Much improvement has been added by the proper use of this form of therapy, for in addition to the actual improvement in muscle power and function there has been noted an accompanying improvement in mental attitude towards life in general. In many instances an otherwise helpless cripple has been started on the way to making a living for himself. This form of treatment therefore should always be included. In addition school work should be continued for the school age child, for this helps in the mental readjustment of these children.

The question now arises, how long should these patients remain in bed? This of course depends upon the amount of involvement, for it follows that a patient with generalized paralysis will have to remain recumbent much longer than one with only one extremity affected. One frequent error and one of the main reasons for the development of deformities is the practice of allowing these patients to sit up in a chair and to get out of bed too soon. Generally speaking ambulatory treatment should not begin until the affected part no longer shows any improvement. A paralyzed deltoid alone that has reached its maximum return of muscle power may be protected with a brace and the patient allowed up. If one or more extremities are involved ambulatory care may be carried out after three successive muscle tests at six to eight week intervals show no further improvement. Trunk and abdominal paralysis, on the other hand, require long periods of bed rest from at least two to two and a half years. At the end of this time, provided the lower extremities are adequate for weight bearing, the back can be suitably braced and the patient allowed up. After being ambulatory the patient's condition should be frequently checked and if deformities are recurring rest in bed should be again resorted to, and braces should be carefully checked to determine if they are at fault. This recurrence of deformity should be particularly watched for in spine and abdominal involvement and if it is appearing patient should be put back in bed and traction applied, for once a structural deformity occurs more stringent treatment is required for correction.

It is needless to say that braces should not be ordered until the extent and nature of the paralysis has been determined. If little or no improvement has occurred after two years of ideal treatment, then the patient should be properly braced and given well supervised and gradual increasing functional activity. The object of bracing is to make possible walking and standing, to relieve strain on weak muscles and make them mechanically more efficient, and last of all, and most important of all, to prevent deformities.

Braces should be made from plaster models. They should be checked regularly for I have seen on several occasions deformities develop even while braces were being worn. They have to be changed from time to time as child develops and grows or else proper support is not being effected. These braces should be worn as long as support is needed for good functional activity or until some type of surgery is done that will eliminate their use.

If treatment has been properly carried out through the acute and convalescent stages deformities should not be present. Ideal treatment is difficult to carry out at times due to lack of proper nursing and physical therapy facilities. Often the parents or someone in the family can be instructed in caring for these children, but frequently they are unable to do so because of large families, poor intelligence, unwillingness to coöperate, and the like. It is difficult too in many instances to have proper supervision of treatment in outlying districts and the family physician is usually too busy to have enough time to spend with these patients. However, I am sure you will find that any effort in supervision of treatment will be well rewarded.

We now come to the chronic stage. The patient has reached a stationary stage in which he has obtained the maximum in muscle return and functional activity. His future depends largely on his existing condition and what his plans are for the years that lie ahead. These factors should govern further treatment. Some can get along well with or without braces; others require surgical intervention. The object of surgery is to correct any existing deformity, to improve function, increase stability, and to get rid of braces. Patient should be at least 8 years of age and preferably a little older before surgery is attempted. This surgery should be done by a trained orthopedist, for here, as in other specialties, there are certain aspects that only such a man can comprehend and treat properly. Much harm has been done by those unqualified for this type of work. There are many surgical procedures that have been designed for these cases among which are spine and other joint fusions, myotomies, tenotomies and tendon lengthenings, muscle and tendon transplants, insertion of fascial slings, leg lengthenings, epiphyseal arrests, etc.

Occupational therapy during this stage may influence a patient's future and should always be kept in mind and prescribed as indicated for each individual case.

I am sure most of you have by this time heard about the treatment for poliomyelitis as designed and carried out by Sister Kenny. I am not going to say much about it at the present time for we have had only one season in which to observe her methods; neither have these results been compared with those of the orthodox treatment, and until this has been done a definite conclusion as to the merits of this treatment cannot be decided upon. I would like to emphasize, however, that this treatment is not just the removal of splints or other supports and application of hot packs, which is the idea one is apt to gain from her reports, but is in addition a definite detailed and specially supervised type of muscle reëducation that requires long and careful treatment. This much can be said—that these patients so treated have a much quicker relief from muscle soreness and tenderness than those treated by the so-called orthodox methods.

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MINNEAPOLIS, MINNESOTA, NOVEMBER, 1942

THE PASSING OF GASTROJEJUNOSTOMY AS A STANDARD OPERATION FOR ULCER*

Gastrojejunostomy was performed first in 1881 in the Billroth Surgical Clinic in Vienna by Wölfler at the suggestion of Nicoladani, for an obstructing pyloric carcinoma. In 1884, Rydgier first performed gastrojejunostomy for benign pyloric stenosis.[1] By 1900, gastrojejunostomy had caught the imagination of gastric surgeons interested in the ulcer problem. Through their ardent enthusiasm over the procedure, gastrojejunostomy became an increasingly popular operation. And up until recently, in this country and in England, gastrojejunostomy has been the surgeons' operation of choice when operation for the relief of duodenal ulcer—and gastric ulcer too, when the item of malignancy was not in question. The keenest exponents of gastric surgery in this country and in England were partial to this procedure, maintaining that it was followed by complete relief of symptoms in 90 per cent of the patients to whom the procedure was applied.[2] The late Lord Moynihan who developed a most remarkable proficiency in performance of the operation stated that he had performed 1,000 consecutive gastrojejunostomies with only a single death —a most extraordinary record indeed! Especially so, when one recollects that the English surgeon goes into small nursing homes to do his operations upon private patients, and, not infrequently, too, away from his more usual sphere of work into remote places. Under these conditions too, a far more difficult task confronts the British surgeon in effecting a complete compilation of his work contrasted with that of his American colleague, whose major activity, if not all, is undertaken in the midst of a single surgical group, housed under one hospital roof.

Moynihan, with a lesser experience in the performance of gastric resection for ulcer conceded a mortality of 2 per cent with this operative procedure. Admitting this disparity in immediate mortality, and allowing too that the small gastric resection is by no means an effective operation for ulcer, with a longer view to ultimate results, it would be an interesting query to know whether time has erased some of the immediate manifest superiority of gastrojejunostomy. At least, it would be fair to conclude that gastrojejunal ulcer had robbed gastrojejunostomy of some of its apparent pristine advantage.

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*From the department of surgery, University of Minnesota Medical School, Minneapolis, Minnesota.

It is becoming increasingly evident that anastomotic operations, typified by gastrojejunostomy, gastroduodenostomy or pyloroplasty, which fail to reduce gastric acidity effectually, are likely to be followed by recurrent ulcer. The irony of the situation becomes evident only when one realizes that, in a number of instances a tardy lag of years obtains between performance of the anastomotic operation and the recognition of the presence of gastrojejunal ulcer. Lannin[4] found, on reviewing the surgical experience of the University Hospital with gastrojejunal ulcer that the average time between gastrojejunostomy and reoperation for gastrojejunal ulcer was 15 years. This astonishingly high figure is accounted for, in part, by reoperation for gastrojejunal ulcer in a few patients as late as 20, 30 and more years after gastrojejunostomy. In one instance, the interval was 38 years. Amongst surgeons, one hears, not uncommonly, that in the older patient with a duodenal ulcer, gastrojejunostomy is an eminently satisfactory operation. Yet, in the past year, a patient of 67 years has been observed in this clinic who had a gastrojejunostomy performed here simultaneous with the closure of a perforated, obstructing duodenal ulcer about 18 months previously. The experience of this clinic suggests too, the thesis, that a patient with an obstructing duodenal ulcer is less susceptible to stomal ulcer after gastrojejunostomy, is but a myth. In reviewing the experience of the University of Chicago clinics, Palmer[5] observed that, in anastomotic operations performed for the relief of ulcer, there was an incidence of gastrojejunal ulcer of 40 per cent.

Man is the only creature in which spontaneous ulcer occurs frequently. As a matter of fact, it has been difficult to bring about the occurrence of ulcer in laboratory animals by means which do not alter grossly, normal anatomic and physiologic circumstances. The experimental production of ulcer with regularity by stimulation of the endogenous gastric secreting mechanism by the intramuscular injection of histamine in beeswax has served to reëmphasize the great importance of acid in the genesis of ulcer.[6,7] Interestingly enough, a dog upon which a gastrojejunostomy has been performed develops an ulcer more readily attending the injection of the histamine-beeswax mixture than does the normal dog.[8] That gastrojejunostomy upon the normal stomach, in man, subjects its owner to the hazards of a stomal ulcer is attested in the reports of patients developing gastrojejunal ulcer years after the performance of gastrojejunostomy for hypertrophic pyloric stenosis.[9]

The experience of this clinic suggests that, only the operation which depresses gastric acidity effectually affords any promise of ridding the patient of the ulcer diathesis.[10] In this respect, the small gastric resection is probably very little better than gastrojejunostomy. A patient was observed in this clinic recently to have a gastrojejunal ulcer, who had a small gastric resection for ulcer more than 30 years ago. The effort of the surgeon should be directed not so much at the ulcer itself—save in the presence of one of its complications, as against the ulcer diathesis. Radical as may appear the three-quarter resection in the surgical management of ulcer the experience of this clinic suggests that this procedure may be performed with minimal risk (1 per cent, excluding acute perforations and bleeding ulcers) and that such an operation rids the patient of the ulcer diathesis, protects against recurrent ulcer, and without prejudice for his future. Inasmuch as no dietary restrictions need be imposed upon the patient after operation, the procedure is especially attractive to the patient who has tired of the standard ulcer diet.

Surgeons, like physicians and patients, look hopefully forward to the time when the ulcer diathesis may be kept in abeyance by lesser means. Until then, the guide of both patient and physician should be no reparative operation for ulcer unless it depresses effectively the gastric secretory capacity! The death-knell of gastrojejunostomy as a standard indication for ulcer has sounded. Gastrojejunostomy will have to be done occasionally on special indication. During the past year, a patient of 79 and one of 84 each had gastrojejunostomy in this clinic for an obstructing ulcer. The histamine-beeswax technic has provided means of determining whether an operation alleged to be beneficial for ulcer may be performed with safety upon patients. The experience of the past fifty years with gastrojejunostomy for ulcer, indicates definitely the fallacy of the empirical method.

REFERENCES

1. McNealy, R. W., and Lichtenstein, M. E.: Surg. Gyn. and Obst. Vol. 60:1003-1015 (May).
2. Eusterman, G. B., and Balfour, D. C.: The Stomach and Duodenum, W. B. Saunders Co., Phila. p. 349.
3. Moynihan, B. G. A.: Lancet 1:1:1932.
4. Lannin, B. G.: Unpublished Master's Thesis, 1942.
5. Palmer, W.: Lecture on ulcer, Hennepin Co. Med. Soc., 1941.
6. Walpole, S. H.; Varco, R. L.; Code, C. F., and Wangensteen, O. H.: Proc. Soc. Exp. Biol. & Med. 44:619:1940.
7. Hay, L. J.; Varco, R. L.; Code, C. F., and Wangensteen, O. H.: Surg. Gyn. and Obst. Vol. 75, pp. 170-182, Aug. 1942.
8. Lannin, B. G.; Hay, L. J.; Judd, E. S., and Wangensteen, O. H.: Unpublished data, 1942.
9. Fowler, L. H., and Hanson, W. A.: Minn. Med. 23:602, Aug. 1940.
10. Wangensteen, O. H., and Lannin, B. G.: Arch. Surg. Vol. 44, pp. 489-500, March 1942.

OWEN H. WANGENSTEEN.

UNIVERSAL FINGERPRINTING

It is unfortunate that since the early application of scientific fingerprinting was directed largely to the solution of criminal problems there has existed in the mind of the public a feeling that the procedure suggests an implication of stigma. But for this it would be much easier to arouse general interest and coöperation in a measure which would be of wide benefit and which entails no hardship on anyone.

It has been estimated that five thousand persons in the United States disappear every year and are never heard of again. Everyone knows or has heard of authentic cases of mistaken identification. Not infrequently the newspapers print stories of bodies being "identified" and buried, only to have the real person turn up later, alive and well. In many other connections inability to establish identity has given rise to embarrassment or even serious situations.

To try to make universal fingerprinting compulsory by law would probably defeat its own ends. But a good start has been made by requiring it of all persons in the armed forces and all government employees, as well as those engaged in war material productions. In time, perhaps, the general public will become alive to its value.

Meanwhile the Bureau of Identification of the Federal Bureau of Investigation has done a fine piece of work in assembling many millions of fingerprint records in its collection in Washington. The value of this is incalculable but it would be much greater if the fingerprints of all were in it.

G. C.

ANOTHER "WEEK"

Fifth annual "Pay-Your-Doctor-Week" will be observed this year November 1 to 7. Inaugurated in 1938, "Pay-Your-Doctor-Week" is now observed annually in scores of cities throughout the United States.

The original purpose of "Pay-Your-Doctor-Week" was to turn the publicity spotlight on the fairly widespread tendency to "let the doctor wait" until all other bills have been paid, and to pay tribute to the members of the healing profession who quietly but relentlessly continue the battle against disease, sickness and death, even now when the world seems bent on destroying itself.

Because "Pay-Your-Doctor-Week" is sponsored by the banks, the question of medical ethics is not involved. The banks call attention to the fact that funds are available to lend for the purpose of paying doctor bills and for similar purposes and urge that instalment credit be used to get out of debt rather than further into debt.

C. B.

Book Reviews

Stedman's Practical Medical Dictionary, 15th revised edition, by Stanley Thomas Garber, B.S., M.D.; Baltimore, the Williams & Wilkins Co., 1942. Pp. 1234, plus appendix of 20 pages. Price, with thumb index, $7.50; without thumb index, $7.00.

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The late Thomas Lathrop Stedman, A.M., M.D. (1853-1938), once editor of the old *Medical Record*, was a fine scholar of such admirable and determined principles that he would use the legitimate Greek *oothecotomy* for the bastard *oophorectomy*, and the unblemished Heliconian *scolecoiditis* for the corrupt *appendicitis*. The tradition is maintained, less intensively, by Dr. Stanley Thomas Garber, of the University of Cincinnati College of Medicine, in the fifteenth and latest edition of Dr. Stedman's famous lexicon. In this work, which has been entirely reset in a new Monotype face, there are several features which will please those who must use a medical dictionary as a workaday tool; persons to whom any saving of time at no expense of accuracy is a most welcome boon. First, diseases are listed, as they ought to be, by their eponymic terms. The reader does not need to blunder through scores of names listed in a section under "disease" to find "Ziehen-Oppenheim disease": He merely turns to section Z of the general text and looks under the proper nouns. Lists, such as those of arteries and muscles, have been arranged typographically in such a manner that they do not interfere with or harass the reader's attention by interrupting the normal alphabetical sequence of the volume. An ingenious but not complex system of diacritical marks informs the reader as to the *official* name (B.N.A., S.A.B., N.K., etc.) when more than one name denotes a part, organism, pharmacologic element, or the like. The correct catch-word to look for in a cross reference also is indicated by this reference system.

Publication of this edition of the Stedman work now makes the dictionary the latest one to be had in the United States. It is conveniently arranged, well printed, and has been called by at least one experienced medical editor "the finest medical dictionary in the English language."

The Lives and Loves of Huber, the Tuber, by Harry A. Wilmer, M.D., Minneapolis, Minnesota; National Tuberculosis Association, New York, N. Y., 1942; 83 pages, 49 illustrations. Price, $1.00.

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Tuberculosis, one of man's most deadly diseases, and once feared by him as much as leprosy, has eventually become a part of his everyday life. How the tubercle bacillus has become adapted to its human habitat, and how man has come to tolerate the tubercle bacillus is told by text and picture in a slim volume of cleverly combined fact and whimsy. The author traces the imaginative history of Huber, a tubercle bacillus, in Lungland where he wages an unsuccessful fight against man, the latter armed with medical skill and aided by the bodies' defense mechanisms. The story is authenticated by sound medical notations to keep it within range of plausibility. The main purpose, of course, is to disseminate information to the lay public concerning the nature of tuberculosis, the various methods man has devised to combat it and man's eventual control over it.

The author, a lieutenant in the Navy Medical Corps, while serving as an intern in the Gorgas Hospital in Panama, became ill with tuberculosis. He returned to his home in Minneapolis, Minnesota, and entered a sanatorium. While abed, his attention was naturally drawn to this particular disease. He decided that he could help himself, and others, to fight the disease, by popularizing methods of treatment. When soldiers of any army can draw pictures of the enemy for their own amusement, half of the battle is won.

Huber is described as entering Lungland on a droplet of moisture via the bronchial tubes. With him come Rusty the Bloodyvitch, Nasty von Sputum, Tokio Tuber and Huey the Long Tuber, representatives of a virulent form of tubercle bacilli, and this unholy crew proceeds to invade and to eat recklessly of the lung tissues. Huber, a descendant of a more moderate strain of tubercle bacillus, advocates moderation. His program is to eat with an eye to keeping both himself and the host alive. The others, however, get the upper hand and run wild in the lung. This arouses the body, and soon the forces of natural resistance of the host, implemented by treatments that are administered by doctors, vanquish the radicals and Huber goes to sleep, dormant in his cell of calcium.

The illustrations are ingeniously conceived, humorous and instructive.

News Items

Dr. Faris Pfister, Webster, South Dakota, is now in Salt Lake City, Utah, where he has reported for duty as captain in the Army medical corps.

Dr. N. J. O'Keefe has been appointed city physician of Butte, Montana, to succeed Dr. R. C. Kane who has entered the armed forces.

Dr. Robert M. Farrish, Litchfield, Minnesota, has received his commission as first lieutenant junior grade in the Naval Reserve. He expects to be called to active service in about three months.

Dr. M. O. Nesheim, Emmons, Minnesota, has been inducted into the medical branch of the U. S. Army air corps as a first lieutenant.

Dr. V. A. Mulligan, Langdon, North Dakota, was elected chief of staff of Mercy hospital when physicians of Cavalier county met at the hospital for their annual election meeting. He succeeds Dr. L. A. Landry of Walhalla. Dr. W. H. Porter of Calvin was elected vice-chief and Dr. G. E. Stromber of Langdon was reelected secretary-treasurer.

Dr. H. R. Cox, chief bacteriologist at the Rocky Mountain laboratory, Hamilton, Montana, and president of the Montana State Public Health association, has announced that he is leaving in November to become associate director of research for the Lederle laboratories, Pearl River, New York. There he will have charge of all virus disease work. Dr. Cox joined the staff of the Rocky mountain laboratory as associate bacteriologist in 1936 and in 1940 was promoted to chief bacteriologist.

Dr. R. V. Fait, Little Falls, Minnesota, has reported for service at the Puget Sound Naval hospital, Bremerton, Washington.

Dr. Ernest A. Wagner has succeeded Dr. D. J. Studer in charge of the Fort Peck hospital, Montana. Dr. Studer has resigned to continue his study in surgery at the Abbott hospital, Minneapolis. Dr. Wagner was associated with the Canton sanatorium and hospital in China from 1937 to 1940. On his return to the United States, he joined the staff of the Paradise Valley sanatorium, National City, California.

Dr. L. H. Heinz, Hastings, Minnesota, has reported for duty at the Aviation Cadet Center, San Antonio, Texas.

Dr. Frank D. Wilson, formerly of Winner, is now practicing in Chamberlain, South Dakota.

A county-wide diphtheria immunization drive was held last month in the county schools by the Blue Earth (Minnesota) county health association with the cooperation of the medical societies.

Dr. M. P. Virnig, Wells, Minnesota, has reported for duty in the Naval Reserve at Bremerton, Washington.

Dr. Wesley A. Lindahl, Minneapolis, has opened offices in Ortonville, Minnesota.

Dr. A. M. Nielsen, Northfield, has reported for service as assistant surgeon in the medical corps of the U. S. Navy at Mare Island, San Francisco. He is a lieutenant, junior grade.

Dr. Adolph M. Hanson, well known Faribault physician, has presented to St. Olaf college, Minnesota, his laboratory equipment, including valuable glass apparatus, according to an announcement by Dr. E. O. Ellingson, head of St. Olaf department of chemistry.

Dr. Willard D. White, Minneapolis, was installed as president of the Hennepin County Medical society at the annual meeting, October 5.

Dr. C. T. McEnaney, Owatonna, has been commissioned a captain in the Army medical corps.

Dr. L. J. Monson reported to the Navy hospital, San Diego, California, October 18, to begin active service as a senior lieutenant in the Naval Reserve.

The name of the Butte Anti-Tuberculosis society has been changed to Silver Bow Tuberculosis society.

Dr. Bernard A. Mason has resigned from the Watson clinic in Brookings, South Dakota.

All officers were reëlected at the annual meeting of the Southwestern Minnesota Sanatorium district in Worthington. Dr. C. L. Sherman, Luverne, is president; Edwin Brickson, Adrian, vice-president; and N. L. Zender, St. James, member of the executive committee. Dr. S. A. Slater, superintendent of the sanatorium, remains as secretary of the board.

Nine members of South Dakota boards and commissions have been reappointed by Governor Bushfield for three to five year terms. Reappointments expiring July 1, 1945, include: Dr. E. H. Prey, Watertown, board of examiners in optometry; Mrs. Anna Haugan Berdahl, Sioux Falls, board of nurses examiners; Dr. F. E.Burkholder, Sioux Falls, and Dr. J. D. Alway, Aberdeen, examiners in basic sciences.

St. John's, St. Peter's and Shodair hospitals of Helena have formed the first hospital council in Montana to provide for adequate hospitalization in that community.

Dr. R. O. Spittler, New Richland, Minnesota, a reserve officer, reported to Fort Sam Houston, Texas, on October 20. He holds the rank of a captain.

The following physicians have been licensed in North Dakota, 1942: Omar Delbert Dekker, Finley; Gerald S. Ahern, Bismarck; Oral Henry Stone, Bottineau; Bernice E. Brown, Grand Forks; Laurence E. Pray, Fargo; Gordon A. Abbott, Staten Island, New York; Robt. M. Fawcett, Rochester, Minnesota; Kenneth E. Fritzell, Minneapolis, Minnesota; Chas. Oliver Hellman, Fargo; Robert E. Mattison, Minot; William R. Fox, Rugby; Malcolm A. McCannel, Minot (at present with Dr. Burch Clinic, doing graduate work); Ernesto Salcmone, Elgin; William Walter Wood (son of Dr. Wood, Jamestown); M. Stuart Grove (was at Ancker Hospital, last report).

The JOURNAL LANCET

Minneapolis, Minnesota
December, 1942

Vol. LXII, No. 12
New Series

Important Advances in the Physiology of the Sex Hormones*

Leo T. Samuels, Ph.D.
Minneapolis, Minnesota

THE practicing physician must at all times keep himself abreast of important developments in the field of medicine; at the same time, he must avoid those practices, however attractive, which, founded on poor evidence, eventually prove to be harmful to the patient. He must form his judgment while being constantly besieged by information which is prejudiced to a greater or less degree. This is particularly true with the sex hormones. The papers of this series present the opinions of a group of individuals who are familiar with the subjects about which they write, and who are not prejudiced in the same way as those who write much of the material which comes to the physician.

In the present article an attempt will be made to present certain recent information which, while not yet applied to human problems in many cases, may be of importance in evaluating clinical work of the future. The fields considered are:

1. The primary changes in tissues after estrogen stimulation.
2. The general metabolic changes produced by the androgens.
3. The role of the liver in the intermediary metabolism of steroid hormones.
4. The extra-genital origin of sex hormones.
5. The large variety of compounds produced from the sex hormones during their intermediary metabolism.
6. The role of the steroid hormones in the genesis of tumors.

1. The gross changes brought about in the female genital system by the estrogens (follicular hormones) and progesterone (corpus luteum hormone); and in the male accessory glands of the gonadal system by the androgens (male sex hormones), are familiar to every physician today. The underlying changes which initiate these more obvious developments have only recently been investigated. Three important facts appear to have been established: (1) the vascular system is affected; (2) the first change in the tissues involves a large shift of water and salts; (3) the changes are not limited to the genital system but are general, particularly in epithelial tissues. Talbot et al[1] found that measurable amounts of water and salts shift from the blood into the uterine tissues within one hour after estrogenic stimulation in the rat. This shift reaches its maximum at about six hours after which measurable increases in metabolic and mitotic activity appear. Reynolds and his coworkers[2,3] have emphasized the importance of the vasodilation produced by estrogens, which he has been able to identify one hour after administration of a single dose of estradiol to a rabbit. Hechter, Lev and Soskin,[4] however, have pointed out that the shift of fluid into the tissues which occurs is much larger than that which fol-

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*From the division of physiological chemistry, University of Minnesota.

Assistance in the preparation of these materials was furnished by the personnel of the Works Project Administration. Official Project No. 165-1-71-124, Sub-project No. 355.

lows a similar degree of vasodilation produced by other means. It seems, then, that both a vasodilation and a change in permeability are the initial results of estrogenic administration.

The shift in fluids produced by the estrogens is not limited to the uterus and vagina; it appears to be true of all epithelial structures. Zuckerman[5] has shown that as much as 5 per cent of the circulating fluid may be stored in the skin at this time. The mucous membranes and secretory glands also undergo varying degrees of hydration, while the water content of the muscles remains constant, and the liver loses water to the circulation. The change is temporary if only a single dose of estrogen is given; the multiplication of cells which follows the fluid shift in the uterus and vagina does not occur in other body tissues.

Certain regions of the skin are particularly sensitive to estrogen stimulation in certain species. In some primates, particularly in the female baboon, the region around the anus and vagina undergoes extensive swelling under the influence of estrogens. Gillman[6,7] has used this as a measure of estrogenic activity and has demonstrated the importance of a balance between the estrogens and progesterone in the changes during the luteal phase of the cycle. In certain individuals changes in the mucous membranes outside the genital system have been known to be associated with gonadal cycles. Mortimer[8] has claimed that estrogens affect the nasal mucous membrane and Richman and Abarbanel[9] claim beneficial effects on the atrophic buccal mucous membrane of menopausal patients.

2. Additional evidence that the sex hormones affect tissues in human beings other than those in which the changes are obvious, has been presented by Kenyon and coworkers.[10] These investigators have studied the influence of testosterone propionate injections and implants on the general metabolism of eunuchoid men. They find a storage of protein, phosphate and potassium which would indicate the formation of muscle protein throughout the organism. At the same time the excretion of creatine is reduced. The basal metabolic rate shows a tendency to rise. In normal men the results are less striking, probably because the injected hormone depresses the formation of the endogenous product.

These properties are not shared by all androgens in proportion to their androgenic activity, however. For instance, the synthetic androgen, methyl testosterone, which is being sold for oral use, has an exactly opposite effect on creatine metabolism, causing increased creatine excretion in panhypopituitary dwarfs, according to Wilkins, Fleischman, et al.[11] These workers found nitrogen storage and growth, however. In our laboratory we have found greatly increased creatine excretion in normal young men after administration of this drug,[12] but no significant effect on total nitrogen metabolism was observed. McCullagh[13] finds a much larger effect on basal metabolic rate in eunuchoids with this drug than has been reported with testosterone. In prescribing this compound, therefore, the physician should realize that he is not strictly duplicating the effects of the natural androgens.

3. The importance of the liver in the destruction of the steroid hormones becomes more obvious as time goes on. Zondek[14] was the first to demonstrate such an action. He has recently reported[15] that he has been able to prepare cell-free extracts from the liver which will cause this destruction. The action appears to be prevented by cyanide and by heat; the active principles are therefore probably oxidative enzymes.[16]

This destruction by the liver is apparently an important factor in the normal regulation of hormone levels. Talbot[17] has shown that immature female rats will go into estrus if the function of a large portion of the liver is destroyed by chronic poisoning with carbon tetrachloride. Continuous estrus can be produced in adult animals by the same method. The ovaries must therefore be producing estrogens at a considerably greater rate than the normal blood level and urine excretion would indicate. The normal adult level is due to a balance between production in the ovaries, and perhaps the adrenals, and the destruction which goes on in the liver. It is therefore possible that many cases of disturbed sex hormone function are due to disturbances of this process in the liver. The margin of safety in the normal liver must be quite large, however, since severe destruction of liver tissue may occur with no apparent disturbance in gonadal function. More attention must be given to the whole problem in relation to diseases associated with abnormal function of the steroid hormones.

The destructive effect of the liver is not only of importance in the physiology and pathology of these hormones; it determines the therapeutic value of different compounds by different routes of administration. Estrone, testosterone and estradiol are relatively inactive by mouth, not because they are poorly absorbed, but because they are rapidly destroyed as they pass through the liver from the portal circulation. Burrill and Greene[18] have shown that methyl testosterone is not rapidly destroyed by the liver: this explains its relatively greater effectiveness by mouth when compared with testosterone. Desoxycorticosterone is not very effective in adrenal insufficiency if given via the gastrointestinal tract although it is active when held under the tongue and absorbed through the mucous membranes of that region; adrenal cortex extracts, on the other hand, are relatively active when swallowed. This is because desoxycorticosterone is more rapidly inactivated by the liver than other adrenal cortex steroids.[19] On the other hand, the difference between the oral activity of estrone and stilbestrol cannot be wholly explained on the basis of liver destruction.

Biskind[20] has recently demonstrated that animals on a diet deficient in the vitamin B complex have a decreased ability to destroy estrogens in the liver. Thus, nutritional conditions are apparently important factors in sex hormone metabolism.

4. Another observation made in recent years which cannot be ignored by the clinician is the evidence that active sex steroids originate outside the genital system. English workers first called attention to the fact that the urines of individuals castrated for many years still contained estrogenic and androgenic substances.[21] The level of estrogens is very low, but apparently, from unpublished work in our own laboratory, all the common estrogens found in normal adult urine still appear. According to Callow and others the excretion of 17-ketosteroid compounds, which consist almost entirely of the androgens, drops sharply after castration in men, but then gradually returns to levels at least half as great as the original.

The major source of these extragonadal sex steroids appears to be the adrenal gland. An active androgen, adrenosterone, was crystallized from cortical extracts by Reichstein.[22] In addition, both progesterone and estrone have been obtained from this source in crystalline form. In cases of adrenal tumors which usually show sex changes, the excretion of 17-ketosteroids is ordinarily well above normal limits. On the other hand, the excretion of these compounds in women with Addison's disease is nil. Fraser et al[23] consider that all of the ketosteroids excreted by women originate in the adrenal gland, since they report that not only is the excretion nil in female Addisonians but that ovariectomy had no significant effect on their level. In our own experience the removal of the ovaries has caused some drop in ketosteroid (androgen) excretion but much less than in the estrogen output. On the other hand, we also find that females with Addison's disease do not excrete a significant amount of ketosteroids. It therefore seems that the adrenal is, or controls, the source of these substances in women.

It is postulated that the adrenals compensatorily increase the output of sex-active steroids when the ovaries or testes cease to function; this would explain the continued excretion in castrates. Huggins has used this postulate as a possible explanation of the failure of castration to relieve prostatic carcinoma in a certain proportion of cases. It has not been demonstrated, however, that such individuals have a higher level of excretion than those who are relieved. This will be discussed further in another paper in this issue.

5. The production and destruction of sex hormones in other tissues than the genital system also explains why bioassays of sex hormone excretion have been of relatively little value as a diagnostic aid in gonadal disturbances. Dorfman[24,25] has demonstrated that a number of closely related but relatively inactive compounds are excreted whenever anyone of the common natural androgenic or estrogenic compounds are given. This is true in castrate hysterectomized women and castrate men, as well as in normal men and women. Marker[26] has found the same to be true for progesterone. The products formed include all the possible chemical stereoisomers, a situation quite different from most biological reactions, where only one isomer is found. Thus, when the sex hormones are administered, only a small percentage of the activity is recovered in the urine, and variability in the intermediate interconversions will conceal changes due to production or administration.

The development of chemical procedures has tended to offset this difficulty. Methods are being introduced which are based upon the analysis for molecular concentrations of steroid compounds containing certain chemical groups. Such is the Zimmerman reaction for steroids with a ketone group on carbon-17. Most of these compounds are androgenic in nature, although of widely varying activity, and originate from either the testes or the adrenal. If from the latter organ, a considerable proportion of the compounds will resemble cholestrol and be precipitated with the alkaloid digitonin, while those from the testis will not. This test is therefore diagnostically useful, both in identifying the source and determining the probable original androgenic levels. Its use will be discussed in a paper by Dr. Szego in this series.

The Kober reaction bears a somewhat similar relation to the estrogens: equimolar amounts of all the natural estrogens produce a similar color with the reagent. At present it has only been successfully applied to pregnancy urine, however, where the estrogenic concentrations are high.

The estimation of sodium pregnanediol glucuronidate or of pregnanediol itself measures only one of the various compounds formed from progesterone: but it, fortunately, seems to be the form into which most of the hormone is converted in women. It has no biological action, and so, as long as bioassay was depended on for information, little was known of corpus luteum function in the human being. By the use of this test, Venning and others have been able to demonstrate the role of the corpus luteum in the normal cycle, the production of progesterone by the placenta during normal pregnancy, and the occurrence of abnormal production of progesterone in certain pathological conditions.

6. The last field to be touched on in this review is that of the relation of the sex hormones to tumor growth. This is not a new field, Loeb[27] having shown in 1919 that ovariectomy lowered the incidence of mammary carcinoma in mice. Soon after active estrogenic extracts were developed, it was shown that the injection of these into male mice of susceptible strains, which normally have no mammary tumors, raised the incidence of such tumors to that in the females. Recently it has been shown that disturbances of nutrition which affect estrogen production, affect the growth of mammary carcinoma in mice.[28]

More recently, it has been shown by many workers that the prolonged injection of estrogens in high dosage will produce chromophobe adenomas of the pituitary gland in several species of animals. No one has yet demonstrated such tumors in human beings. Lipschütz[29,30] has produced extensive uterine myomata in guinea pigs. The treatment must be continuous to produce tumors. When injected thrice weekly, 47 injections are required in domestic guinea pigs; but if injections are made for one week and then interrupted for a period of two or three weeks, this periodic repetition will never produce tumors, even with larger quantities and more total injections. He has also found that, while prolonged injections are necessary in domestic guinea pigs, a single injection may produce the same change in the wild variety. This variation in sensitivity makes it difficult to predict under what conditions individual human beings, which are such genetic mixtures, would show similar reactions to estrogens.

Huggins' findings on the effect of castration upon carcinoma of the prostate will be discussed in another paper of this series. The observations of this group of workers are not only of interest because they demonstrate the relation of another sex hormone to tumor development, but also because, for the first time, they have used the measurements of a product of a gland stimulated by a sex hormone to gauge the effective production of the hormone. They have shown that the levels of acid phosphatase in the blood and urine are related to the activity of the prostate, and therefore, indirectly to the amount of androgenic stimulus.[31] Woolley[32] has found another tumor in mice which is profoundly affected by the gonads. If mice of a certain strain are castrated, they develop malignant tumors of the adrenals. If castration is not performed, the tumors never appear. What the influence of the gonads is has not yet been elucidated, but this adds another point to the mounting evidence that, while steroids are probably not the sole or primary factors in the etiology of tumors, they exert important influences on the metabolism of cells which often determine the possibility of tumor development.

Most of the factors which have been discussed in this paper are not as yet sufficiently understood to be applied to the human being. A few have already been successfully used. All are factors, however, which, according to our present evidence, must be kept in mind by the physician as research workers delve further into their significance to the human race.

BIBLIOGRAPHY

1. Talbot, N. B., O. H. Lowry and E. E. Astwood: J. Biol. Chem. 132:1 (1940).
2. MacLeod, J., and S. R. M. Reynolds: Proc. Soc. Exper Biol. & Med. 37:666 (1938).
3. Reynolds, S. R. M., and F. I. Foster: J. Pharm. Exper. Therap. 68:173 (1940).
4. Hechter, O., M. Lev and S. Soskin: Endocrinology 26:73 (1940).
5. Zuckerman, S.: J. Endocrinology 1:147 (1939).
6. Gillman, J.: J. Clin. Endocrinology 2:146, 161 (1942).
7. Gillman, J.: Endocrinology 31:167, 172 (1942).
8. Mortimer, H., J. P. Wright and J. B. Collip: Canad. M. A. J. 35:615 (1936).
9. Richman, M. J., and A R. Abarbanel: Endocrinology 30:510 (1942).
10. Kenyon, A. T., K. Knowlton, T. Sandiford, F. C. Koch and G. Lotwin: Endocrinology 26:26 (1940).
11. Wilkins, L., W. Fleischmann and J. E. Howard: Bull. Johns Hopkins Hosp. 29:493 (1941).
12. Samuels, L. T., A. F. Henschel and Ancel Keys: J. Clin. Endocrinology 2:649 (1942).
13. McCullagh, E. P., and H. R. Rossmiller: J. Clin. Endocrinology 1:503 (1941).
14. Zondek, B.: Lancet 227:356 (1934).
15. Zondek, B.: Genital functions and their hormonal regulation: Baltimore, 1941, Williams & Wilkins.
16. Heller, C. G.: Endocrinology 26:619 (1940).
17. Talbot, N. B.: Endocrinology 25:601 (1939).
18. Burrill, M. W., and R. R. Greene: Endocrinology 31:73 (1942).
19. Burrill, M. W., and R. R. Greene: Endocrinology 30:142 (1942).
20. Biskind, M. S., and G. R. Biskind: Endocrinology 31:109 (1942).
21. Robson. J. M., T. N. McGregor, R. E. Illingworth and N. Steere: Brit. M. J. 1:888 (1934).
22. Reichstein, I. T.: Helvet. med. Acta 19:223 (1936).
23. Fraser, R. W., A. P. Forbes, Fuller Albright. H. Sulkowitch and E. C. Reifenstein, Jr.: J. Clin. Endocrinology 1:234 (1941).
24. Dorfman, R. I.: Proc. Soc. Exper. Biol. & Med. 46:351 (1941).
25. Fish, W. R., and R. I. Dorfman: J. Biol. Chem. 143:1 (1942).
26. Marker, R. E.: J. Am. Chem. Soc. 59:616 (1937).
27. Loeb, L.: J. Med. Research 40:477 (1919).
28. Visscher, Maurice B., Z. B. Ball, R. H. Barnes and Ivar Sivertsen: Surgery 11:48 (1942).
29. Lipschütz, A., F. Rodriguez and L. Vargas, Jr.: Endocrinology 28:664 (1941).
30. Lipschütz, A., R. Thibaut and L. Vargas, Jr.: Cancer Research 2:1 (1942).
31. Scott. W. W., and C. Huggins: Endocrinology 30:107 (1942).
32. Woolley, G., E. Fekete and C. C. Little: Proc. Nat. Acad. Sc. 25:277 (1939).

Methods of Measurement of the Naturally Occurring Sex Hormones*

Clara M. Szego, Ph.D.
Minneapolis, Minnesota

CHEMICAL and biological methods for the estimation of the sex hormones are still in a state of flux. Their clinical application, in most cases, has been attempted previous to their perfection in the research laboratory.

The development of analytical methods has contributed potential tools for the study of the metabolism of the sex hormones *in vivo*. The clinician is interested in such working tools for three general purposes:

1. For standardization of the potency of the active materials in therapeutic preparations.
2. For diagnosis of pathological states by urinary excretion studies.
3. As a guide to clinical therapy.

In this discussion, we propose to deal primarily with the analytical methods themselves. At the same time, an evaluation of their clinical adaptability will be attempted.

THE ESTROGENS

I. Biological Methods of Assay

From the earliest studies on the estrogenic hormones, it has been demonstrated that the estrogens have definite physiological and pharmacological effects on the female generative tract. These effects are sufficiently reproducible under controlled conditions to be used as criteria in biological assay. Theoretically, any one of them may be used in test animals surgically deprived of their endogenous sources of the hormone. The known castration effects may be reversed by adequate dosage. Also, in immature intact animals, a standard degree of development of a secondary sex character or accessory genital organ may similarly be produced in advance of its normal occurrence.

A. Vaginal Smear Method

The technic of biological assay developed by Allen and Doisy in 1923-4[1] following the observations of Stockard and Papanicolaou that cyclic changes in the vaginal epithelium occur during the course of estrus in normal mature rodents, measurably aided the early progress of research in the estrogenic hormones.

The test, as it is commonly used today, consists of the interpretation of the type of cells in the vaginal smear of spayed animals, rats or mice, in which an artificial estrus may or may not have been induced, depending upon the concentration of estrogenic material injected. The endpoint is taken as full or partial cornification of the vaginal epithelium (depending upon the standard of the particular laboratory). By the use of modified Allen-Doisy technics, investigators have arrived at a general picture of urinary estrogen excretion during the normal menstrual cycle. A double peak of excretion levels appears to exist, one at mid-cycle, and the other premenstrually. Excretion during the bleeding period is low. The urinary level of estrogen during pregnancy shows a gradual rise, with a sharp drop at the time of parturition.

Since the introduction of the Allen-Doisy technic, many variations have been introduced. They have dealt primarily with refinements and elaborations of technic, designed to increase sensitivity or accuracy. In general, variation of the nature of the vehicle, the route of administration, the number of injections of divided doses, and the number and relative time of vaginal examinations, have been found to affect profoundly the results of analyses by this bioassay method. These have been admirably summarized by Emmens.[2]

The errors due to individual animal variation have been partially overcome by the practice, now generally used, of injecting a standard dose of a known estrogen at the same time into a group of animals similar to that used for the unknown. Using groups of 20 animals, this will give correct values within an error of ± 20 per cent if the unknown being measured is a pure solution of the same hormone as the standard in the same solvent. Generally, the quantity of hormone which will produce cornification in 50 per cent of the animals under standardized conditions has been designated as the Rat or Mouse Unit. The rat unit is estimated to be approximately equivalent to 0.33 micrograms of International Standard Estrone.

Superimposed upon errors arising from the use of the experimental animal as a test object, is the difficulty encountered in interpreting the actual hormone content of unknown mixtures. The generally recognized[3] variation in physiological activity among the several natural estrogenic hormones renders the methods which rely on animal indicators inadequate for many investigations. In addition, the synergistic effects of certain fatty acids,[4] make the assay of crude lipid-contaminated biological extracts still more difficult of interpretation. These drawbacks to the use of bioassay for the estrogenic hormones are in general applicable to bioassay procedures for the other sex hormones; in particular, the androgens.

B. Uterine Weight Method

The earliest investigations of the estrogens isolated in crude form were tested for biological activity on the uterus of the castrate or immature rabbit. The production of hyperplasia and hypertrophy under these conditions served as a rough index of the activity of the injected extract.

More recently, this test has been revived in its application to the rat and mouse, both castrate and immature.[5] Astwood[6] first noted the striking, relatively early response of the immature rat uterus to injected estrogens. This response was found to be due to an early, rapid uptake of water, which was followed by hyperplasia. The early increase in uterine weight due to water uptake in response to estrogens is the basis for the Astwood six-hour assay method. This test can only be used for a certain limited range of dosage with estriol, alone and in mixtures, because there is a limit to the growth of the uterus under the influence of this hormone.[3,7]

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*From the department of physiology, University of Minnesota.

For this reason, one is forced to weigh carefully attempts to quantitate mixtures of estrogens by the rodent uterine weight technic. In addition to individual animal variability and failure to ascertain concentrations of individual estrogens in a complex mixture (such as encountered from biological sources), the test is subject to the criticism of lack of lineal relation of response to dose in the case of any but minute amounts of estriol. This latter criticism applies particularly to the assay of urinary estrogens, in which estriol has been shown to predominate under certain conditions.[8] In addition, the augmentation: inhibition effects previously noted[4] are applicable here.

A test for the small quantities of estrogen present in the circulating blood long has been desirable. To meet this requirement, a method must possess extreme sensitivity since there must be sufficient material from a sample of blood to treat a number of animals; otherwise, the error due to individual variation is too great. Local vaginal application of a suitable concentrate of the material to be assayed has been advocated by Lyons and Templeton.[9] This technic has been applied to the study of estrogen concentrations in the circulating blood by Albrieux[10] and others. The method is impracticable as yet for routine application to more than a few limited cases.

Obviously, an overall biological assay for total estrogen (or androgen) fails to give information as to whether high molecular concentrations of physiologically relatively inactive material, or small amounts of the more active forms are present in a complex mixture. While overall activity is of recognized, if limited, significance, the usefulness of many clinical studies is enhanced by the estimation of the various fractions present. In order to achieve this end, either laborious fractionation procedures must be instituted, or methods possessing greater definitive characteristics for the individual hormones must be employed. These latter are of necessity chemical, and must, above all, be specific if possible without sacrifice of sensitivity or precision.

II. Chemical Methods of Assay

A. Colorimetry

The field of research in chemical methods of detection and estimation of the estrogens is in a state of flux, due to the recognition of the shortcomings of existing methods. The generalization may be made, that while most of the present chemical procedures meet the requirements of sensitivity and precision with the pure crystalline hormone preparations, they fail in their application to biological extracts, prepared in the usual manner.

The colorimetric reaction most commonly used is that discovered by Kober,[11] in which the natural estrogens react with phenolsulphonic acid to give a pink color. At present, the best modification of this reaction would seem to be that of Venning et al.[12] which can be applied with reasonable accuracy to urines during the latter half of pregnancy, but is unsuited for estimations in urine of normal non-pregnant women. Equimolar concentrations of the natural estrogens give similar intensities of color.

Other chemical methods proposed for the estrogenic hormones have appeared. Several of them utilize the phenolic character of these hormones in obtaining a colored azo compound.[13,14] They do not serve to distinguish physiologically active from relatively inactive forms of the estrogens, since all three estrogens have equal colorimetric effect. A specific method for estriol appeared in 1934.[15] Its application to human urine extracts has not been possible.[16] Similarly, the practical use of the Bachman method[17a] for the estimation of estriol in the presence of the other estrogens is not yet at hand, although its application to the estimation of the relatively large concentrations of estrin in pregnancy urine has been reported by the Bachman group.[17b] A review of existing colorimetric methods for the estrogens appeared by Pincus et al. in 1936.[16]

Szego and Samuels, in 1939, reported a colorimetric method which served to distinguish estrone in the presence of estriol.[18a] A modification of this method, measuring estrone and estradiol simultaneously in the presence of estriol has also been reported.[18b] These have thus far been successful only on the pure crystalline compounds. Another modification, however, has been applied to highly purified extracts prepared from cow endometrium to which known amounts of estrogen were added and serves to measure total estrone and estradiol without interference from estriol.[19] This is now being used to study the metabolism of these compounds in both bovine and human uteri.

B. Absorption Spectrophotometry

Chevalier et al. reported in 1935[20] that direct spectrophotometric analysis of those pregnancy urines for which biological assay and the Kober test were positive, showed a characteristic ultraviolet absorption band with a maximum at 2800 Å, a phenomenon never encountered in non-pregnancy or male urines. The same results were obtained with crystalline estrone. Direct quantitative determination of estrin in pregnancy urine extracts was suggested. The relatively low sensitivity of the method in the hands of the French workers did not recommend it for application to urines during the normal menstrual cycle. Reynolds and Ginsburg[21] have recently reinvestigated the possibilities of absorption spectrophotometry as a quantitative method for various sex hormones, and suggested a technic for the estimation of estrone and progesterone on the basis of extreme differences in their absorption curves. The measuremnt of total estrogens and of progesterone is possible by this means in highly purified extracts at an optimal hormone dilution level. Since the latter requirement is impossible with limited amounts of unknown mixtures of biological origin, it was acknowledged to be a drawback to general application until further work could be done. The possible application of such methods to the determination of the small amounts of hormone in circulating blood is brought out in the report.

Absorption spectrophotometry has also been applied with comparative success to the standardization of pure crystalline pharmaceutical preparations of estrone.[22]

C. Polarography

Polarography is not applicable to the non-ketonic estriol and estradiol, although estrone is determinable by this technic after suitable pre-treatment with the Girard reagent.[23] The disadvantages of this method for estrone are relative lack of sensitivity and the need for quantitative conversion to the Girard derivative.

While it is apparent that non-biological methods of assay for the estrogenic hormones show promise for routine clinical application, none has supplanted the biological methods except for special studies of a limited nature. The chief drawback has been the need for rigorous purification without significant loss of the small amounts of active material in biological extracts.

THE ANDROGENS

I. Biological Methods of Assay

The growth response of the comb of the capon was found by early workers to be an indicator of the presence of testicular material.[24] The application of this phenomenon to the quantitative determination of androgenic extracts has been made by several groups of investigators. The Koch group has done the pioneer work in outlining this technic, and define their *bird unit* as "that amount of hormone which, when injected intramuscularly daily for five days, yields an average of 5 mm. increase in length and height of the combs of at least five Brown Leghorn capons".[25] Since light has been shown[26] to have significant effects on the growth of the comb, a permanent stock standard must be run in parallel with each set of unknows. The technic of assay has varied to such an extent from laboratory to laboratory, that it is essential for each worker to define his bird unit before his results can be understood.

The disadvantages of the capon assay method are the length of time for an assay, the necessity of keeping a large flock of full grown birds, and the low sensitivity. For these reasons, Dorfman suggested the use of the baby chick as the test object. The increased sensitivity of this animal was at first thought to be an overwhelming advantage. However, later work has shown that individual variability from animal to animal, and in the same animal from assay to assay, overcomes the initial advantage.

Mammalian indicators for the male sex hormones which have been applied to their quantitative determination in the castrate animal are maintenance of spermatozoön motility, the production of a histological picture of secretory activity in the accessory genital organs, and the maintenance of external genitalia, etc. Of these, the most widely used has been the production of a standard increase in weight of the prostate and seminal vesicles of the castrate rat.[27]

The second conference on standardization of sex hormones held in London in 1935, however, came to the conclusion that of all the available bioassay methods for the male sex hormones the capon comb growth method was the most reliable for comparison of androgenic activity of unknown extracts with the International Standard preparation. The International Standard was at this time designated as crystalline androsterone, and the unit of activity, approximately equal to one bird unit, was 0.1 mg. The difficulties of interpreting the androgenic activity of crude, lipid-contaminated extracts, as discussed in connection with estrogen bioassay,[4] may be reemphasized here.

II. Chemical Methods of Assay

A. Colorimetric

In the case of the male sex hormones, there exists a colorimetric method of determination which has had considerable clinical application. The Zimmerman method[28] and its numerous modifications involves the so-called "active methylene group" of ring D,‡ with which alcoholic m-dinitrobenzene gives a magenta color in the presence of aqueous alkali. The test is non-specific, a color being given by many other ketones including estrone and progesterone. While the androgens in urine extracts subjected to the proper preliminary fractionation procedures *are* the predominating compounds containing the specified grouping, enough interfering compounds may be present, according to many workers, to demand absorption spectroscopy methods for estimating the color. As an alternative to this step, rigid fractionation of the various compounds containing the characteristic reactive grouping has been instituted by some workers.

Dehydroisoandrosterone, of lesser physiological activity than androsterone, gives rise to a similar amount of color. Thus, colorimetric determinations of urinary androgenic material by this method cannot be interpreted in any other manner than as "17-ketosteroids" in terms of a standard androsterone curve—as equivalents.

Since the ratio of excreted androsterone to dehydroisoandrosterone and isoandrosterone is lower than normal in cases of adreno-cortical tumor, a method of their separate estimation is found useful. The androgens of presumably adrenal origin, dehydroisoandrosterone and isoandrosterone, are beta compounds similar in configuration to cholesterol, and will precipitate when treated with digitonin, while androsterone, an alpha compound, will not. This forms a convenient basis for their separation, and enables one to determine both fractions subsequently by the Zimmerman reaction.

A rise in the total urinary 17-ketosteroid excretion has been correlated with both malignant tumors of the adrenal cortex and with simple hyperplasia. A measure of the ratio of beta:alpha 17-ketosteroids is of value in helping to establish the differential diagnosis. Dobriner and coworkers[29] have found that beta 17-ketosteroids make up 0.6 to 2.2 per cent of the total in the normal. In simple adrenal hyperplasia, beta 17-ketosteroids may comprise 4 to 12 per cent of the total. The proportion of beta compounds in cases of malignant adrenocortical tumor may go up to 65 per cent of the total.

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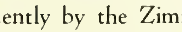
‡ 

$-CH_2-\underset{\displaystyle C}{\underset{|}{C}}=O$

Significant cyclic variations of 17-ketosteroid levels in 24-hour urine specimens do not appear to occur in normal men nor in women during the menstrual cycle. It has been shown,[30] and confirmed in this laboratory,§ that the urinary level in women with Addison's disease is well below normal.

Testosterone, the testicular androgenic hormone, does not form a significant part of the urinary androgens. It is, however, the only active form identified in testes. Not being a 17-ketosteroid, moreover, it is not measurable by the Zimmerman reaction. A colorimetric method for the pure compound has appeared from this laboratory.[31] It is being applied to a study of testosterone metabolism.

B. Polarographic Methods

Certain unsaturated ketosteroids have been shown to be reducible at the dropping mercury electrode. Wolfe, Hershberg and Fieser[23] have made a comprehensive study of 3- and 17-ketosteroid analysis by means of the polarograph. They were able to introduce a method of measurement of androsterone by the preparation of the Girard derivative, as mentioned in the case of estrone. By suitable technic, testosterone could be determined in the presence of androsterone, in some cases with the simultaneous determination of the latter. The application of polarographic technic for the determination of urinary androgens is far from being a routine matter at the present time due to technical difficulties involved.

PROGESTERONE

I. BIOLOGICAL METHODS OF ASSAY

A. The Corner-Allen Method

The method of Corner and Allen published in 1929[32] was the first widely accepted assay technic for the hormone of the corpus luteum, and in a certain sense, forms the basis for several modifications thereafter employed. The end-point of this method is the histological modification of the uterine endometrium described by Corner as "progestational proliferation," which is qualitatively and quantitatively different from the type of proliferation produced by estrin alone. The test object is the uterus of the mature ovariectomized rabbit, the reaction of which to injected progestin is graded on a standardized reaction scale. The Corner-Allen scale of reaction ranges from + to ++++, the reaction elicited by one milligram of crystalline progesterone being +++. This is the Corner-Allen rabbit unit, (Rb. U.), equivalent to one International Unit. In the hands of many investigators, this method has proved quite reproducible, and has found considerable application. Its disadvantages, however, are the time involved, the comparatively low sensitivity of the mature rabbit uterus, and the variation between individual animals.

B. The Clauberg Method

The Clauberg method, published in 1930,[33] is based upon the observation that whereas progestin produces no apparent proliferation of the immature rabbit uterus, preliminary priming of this organ by estrin treatment renders it capable of responding to progestin stimulation. The Clauberg unit is the minimum quantity of active material required to produce a full (or +++) proliferation under certain standardized conditions. The increase in sensitivity is considerable, the Clauberg unit being 0.6 to 0.7 mgs. in contrast to the 1.0 mg. unit of the Corner-Allen method on the mature rabbit. In addition, ovariectomy is not required in the Clauberg technic. In the hands of McPhail,[34] the Clauberg method has proved less reliable than the Corner-Allen, however, for the immature rabbit uterus shows greater individual variability than that of the mature animal.

Neither bioassay method is sufficiently sensitive to measure the quantities of progesterone present in blood.

II. OTHER METHODS

An indirect method for the estimation of progesterone is the measurement of its urinary metabolite, pregnandiol, a reduced form which does not have progestational activity. The best known technic for the estimation of this compound is the gravimetric method introduced by Venning.[35] The method involves the isolation of the conjugated salt, sodium pregnandiol glycuronidate, from urine by suitable fractionation and purification procedures. After weighing, identification of the crystalline material by melting point is a rather important criterion, for urinary impurities are often carried down by the isolation procedure. Precautions must be taken to preserve the urine specimen with sodium cyanide to prevent hydrolysis of the conjugated salt by bacterial action. Free pregnandiol is not estimated by this method. The Venning method is relatively accurate for the quantities of the salt present in pregnancy urine. The relatively small amounts of sodium pregnandiol glycuronidate which appear in urines during the latter half of the menstrual cycle are subject to significant error when estimated by this method, however, and the results can only be considered in a semi-quantitative sense.

To obviate the losses due to hydrolysis of the sodium pregnandiol glycuronidate complex, Astwood and Jones[36] proposed a method which involves the deliberate liberation of the free pregnandiol by preliminary acid hydrolysis, and the determination of the free material by a gravimetric method. The analytical errors involved in this technic are of the order of magnitude of those of the Venning procedure, but the method is more reliable when applied to urine for the inconstant factor of spontaneous hydrolysis is eliminated.

The recent work of Reynolds and Ginsburg[21] mentioned in connection with absorption spectrophotometry and the estrogens, may be recalled here. The method shows much promise as far as measurement of progesterone in plasma is concerned, although it is admittedly limited in its routine application at the present time.

GONADOTROPIC HORMONES

Biological assay for the gonadotropic hormones of extra-hypophyseal origin is the most common clinical application of a method of measurement of a sex hormone.

The substance to be determined is anterior pituitary-like hormone (A.P.L.), or chorionic gonadotropin (C.G.), also called P.U. (from pregnancy urine). The source of this hormone in pregnancy is the developing trophoblast.

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§ Unpublished data.

I. The Friedman Test[37]

The test object is a mature female virgin rabbit, isolated from other animals for at least two to three weeks prior to use. The rabbit, like the cat and the ferret, ovulates only when afferent somatic impulses during copulation reach the pituitary and stimulate gonadotropic hormone production, or when gonadotropins such as C.G. are injected. Ovulation, shown by recent corpora hemorrhagica in the ovaries, results after an approximately 24-hour latent period. The sharp end-point is of advantage in this test. The mere presence of large unruptured follicles on autopsy is not diagnostic of a positive test.

The urinary C.G. during a normal pregnancy is at a peak between the second and third months of gestation, after which time it falls to more moderate levels until parturition. This is in contrast to the gradual rise of excreted estrogens and pregnandiol throughout gestation. Because the rise in C.G. is so rapid, the Friedman test is positive five days after the last missed menstrual period, or approximately nineteen days after ovulation, and is probably the best early indicator of pregnancy. Its accuracy is of the order of 98 per cent.

II. The Ascheim-Zondek Test[38]

This test for urinary gonadotropins depends on the production of corpora hemorrhagica, with or without luteinization, in the immature mouse. The Ascheim-Zondek test lends itself more easily than the Friedman to quantitative estimation, but has the disadvantage of involving a longer period of time.

Roughly quantitative biological tests for A.P.L. are of value as confirmatory tests in pathological states such as ectopic pregnancy, and various neoplasms including hydatid mole. Twin pregnancy, in which case the larger amount of chorionic tissue may give values of the same order of magnitude as hydatid mole, is a complicating factor. The differential diagnosis may be established by X-ray procedures.

If the test is negative after removal of a hydatid mole, and then again becomes positive with the lapse of time, it may be indicative of transformation to malignant chorionepithelioma. Urinary assays are of value in following the metastatic course of such a condition. Teratoma testis is also characterized by a high output of A.P.L. which is associated in general with tumors containing chorionic elements.

Methods of estimating the comparatively low amounts of urinary gonadotropin, presumably of pituitary source, during the normal menstrual cycle, involve precipitation and subsequent concentration of the active principles prior to biological assay. The actual test is usually a modification of the immature rat or mouse technic. The methods differ in technic of chemical treatment, largely in the nature of the protein precipitant used. Most of these methods indicate that there may be one to three peaks of gonadotropin excretion during a menstrual cycle, the levels at other times being low. The results must be interpreted with great care in view of the shortcomings of all gonadotropic assay methods with which any quantitation is attempted. The use of adequate controls with these and other biological methods cannot be overemphasized.

The above discussion has attempted to describe a number of assay methods for the sex hormones which has led us to find out certain pertinent facts. Some of these methods give promise of general clinical application. It is apparent, however, that more work is necessary before most of them can be of service to the practicing physician.

Bibliography

1. Allen, E., Doisy, E. A., Francis, B. F., Robertson, L. L., Colgate, C. E., Johnston, C. G., Kountz, W. B., and Gibson, H. V.: Am. J. Anat. 34:133 (1924-25).

2. Emmens, C. W.: Med. Research Council, Reports on Biological Standards, V. London (1939).

3. Dorfman, R. I., Gallagher, T. F., and Koch, F. C.: Endocrin. 19:33 (1935).

4. Miescher, K., Wettstein, A., and Tschopp, E.: Schweiz. med. Wchnschr. 66:310 (1936).

5. Bülbring, E., and Burn, J. A.: J. Physiol. 85:320 (1935).

6. Astwood, E. B.: Endocrin. 23:25 (1938).

7. Lauson, H. D., Heller, C. G., Golden, J. B., and Sevringhaus, E. L.: Endocrin. 24:35 (1939).

8. Smith, G. V. S., Smith, O. W., and Pincus, G.: Am. J. Physiol. 121:98 (1938).

9. Lyons, W. R., and Templeton, H. J.: Proc. Soc. Exper. Biol. & Med. 33:587 (1936).

10. Albrieux, A. S.: Proc. Soc. Exper. Biol. & Med. 47:380, 381 (1941).

11. Kober, S.: Biochem. Z. 239:209 (1931).

12. Venning, E. H., Evelyn, K. A., Harkness, E. V., and Browne, J. S. L.: J. Biol. Chem. 120:225 (1937).

13. Smulovitz, M. J., and Wylie, H. B.: J. Lab. & Clin. Med. 21;210 (1935).

14. Talbot, N. B., Wolfe, J. K., MacLachlan, E. A., Karush, F., and Butler, A. M.: J. Biol. Chem. 134:319 (1940).

15. David, K.: Acta Brev. Neerland 4:64 (1934).

16. Pincus, G., Wheeler, G., Young, G., and Zahl, P. A.: J. Biol. Chem. 116:253 (1936).

17a. Bachman, C.: J. Biol. Chem. 131:463 (1939).

17b. Bachman, C., and Pettit, D. S.: J. Biol. Chem. 138:689 (1941).

18a. Szego, C. M., and Samuels, L. T.: Proc. Soc. Exper. Biol. & Med. 43:263 (1940).

18b. Szego, C. M., and Samuels, L. T.: Federation Proceedings, Am. Soc. Exper. Biol. 1:169, March, 1942.

19. Szego, C. M.: Ph.D. Thesis, University of Minnesota, 1942.

20. Chevallier, A., Cornil, L., and Verdollin, J.: Bull. Acad. Med. (Fr.) 114:171 (1935).

21. Reynolds, S. R. M., and Ginsburg, N.: Endocrin. 31:147 (1942).

22. Elvidge, W. F.: Quart. J. Pharmacy and Pharmacol.12:347 (1939).

23. Wolfe, J. K., Hershberg, E. B., and Fieser, L. F.: J. Biol. Chem. 136:653 (1940).

24. Berthold, A. A.: Arch. f. Anat. Physiol. u. Wissensch. Med. 42, (1849).

25. Gallagher, T. F., and Koch, F. C.: J. Pharmacol. & Exp. Therap. 40:327 (1930).

26. Koch, F. C., and Gallagher, T. F.: Proc. Soc. Biol. Chem. p. xlix (1934).

27. Korenchevsky, V.: Biochem. J. 26:1300 (1932).

28. Zimmerman, W.: Z. physiol. Chem. 233:257 (1935).

29. Dobriner, K., Gordon, E., Rhoads, C. P., Lieberman, S., and Fieser, L. F.: Science 95:534 (1942).

30. Fraser, R. W., Forbes, A. P., Albright, F., Sulkowitch, H., and Reifenstein, E. C.: J. Clin. Endocrin. 1:234 (1941).

31. Koenig, V. L., Melzer, F., Szego, C. M., and Samuels, L. T.: J. Biol. Chem. 141:487 (1941).

32. Corner, G. W.: Am. J. Physiol. 88:326 (1929).

33. Clauberg, C.: Zentralbl. f. Gynak. 54:2757 (1930).

34. McPhail, M. K.: J. Physiol. 83:145 (1934).

35. Venning, E. H.: J. Biol. Chem. 119:473 (1937).

36. Astwood, E. B., and Jones, G. E. S.: J. Biol. Chem. 137:397 (1941).

37. Friedman, M. H.: Am. J. Physiol. 90:617 (1929).

38. Ascheim, S., and Zondek, B.: Klin. Wchnschr. 7:1404, 1453 (1928).

The Endocrine Factors in Menstruation and Its Relation to Dysmenorrhea*

Nora Winther, M.D.
Minneapolis, Minnesota

THE broad definition of menstruation includes all of the factors associated with cyclic bleeding from the uterus. The changes in the endometrium are controlled by a complex endocrine mechanism. Obviously, uterine bleeding may occur under many conditions. Endometrial biopsies taken on the same day of the menstrual cycle vary in different women.

It is more satisfactory to limit the term, menstruation, to "bleeding which occurs from an endometrium which has undergone the cycle of changes necessary for nidation." Only an endometrium which has undergone such changes can be considered normal, since the sole physiological purpose of the uterus is to house and nourish the fetus until it is able to maintain a separate existence. If menstruation is to be considered a normal phenomenon, then it must be the change in a normal structure.

Progesterone seems to be the primary factor involved in menstruation. The output of hormones has been studied by assays on both blood[1] and urine. The normal woman shows two peaks of estrogen excretion: one at the time of ovulation and one during the last half of the cycle. The output then falls to very low levels at the time of menstruation. During the latter half of the cycle, pregnanediol, the metabolic product of progesterone also appears in the urine. It disappears twenty-four to seventy-two hours before bleeding begins. Both types of hormone are therefore low at the menses. The drop in estrogens cannot be considered the cause of the bleeding, however. The castrate woman will bleed seven to fourteen days after cessation of a fairly heavy dosage of estrogens, but this is not menstruation according to the more specific definition, for the structure of the endometrium is not that seen in the normal uterus at the menses, but resembles that seen in cystic glandular hyperplasia. Neither can estrogen withdrawal be the cause of normal menstruation, for the interval between the drop in estrogens and the onset of bleeding is too short. On the other hand, bleeding from an endometrium histologically similar to that seen in normal menstruation can be produced in castrate monkeys and women if the subject is first treated with estrogens, then with progesterone, and the latter injections stopped. Bleeding follows in 24 to 72 hours, the interval observed in normal menstrual cycles after the disappearance of pregnanediol from the urine. Bleeding will not occur as long as the injection of progesterone is continued.

If both estrogens and progesterone are administered, and the former then stopped while the latter is continued at constant dosage menstruation will not occur. However, if both hormones are administered and progesterone is then discontinued while the estrogens are continued at the same level, bleeding occurs in a normal manner within seventy-two hours of progesterone cessation. If progesterone is administered to a normal woman during the first half of a normal cycle, bleeding will occur from a secretory endometrium within the usual interval after the hormone treatment is stopped, according to Gillman and others. It would seem, therefore, that the drop in production of progesterone is the primary cause of normal menstruation.

However, estrogens apparently must also act during the second half of the cycle to form a normal endometrium. Hisaw, Greep and Fevold[13] have shown that the estrogens potentiate the action of progesterone in monkeys, and Gillman[11] has shown that there is an optimal estrogen-progesterone ratio for the normal cycle in women. In our own series, as cited later, sterility was associated with an absence of the estrogen excretion peak during the second half of the cycle.

All of the endocrine glands probably influence the menstrual cycle. It is dependent upon the hormone or hormones of the anterior pituitary gland. Hypophysectomy in animals results in genital atrophy. Administration of extracts of the anterior pituitary in these hypophysectomized animals restores the genitals to normal. Small doses of irradiation to the pituitary has affected menstruation clinically. Castration cells have been found after the menopause and after complete ovariectomy.

Gonadotropic hormone from pregnant mare's serum given to women in the first part of the menstrual cycle increased the output of estrogens but did not effect the pregnanediol levels in our series.

Thyroid extracts given orally also appear to have an effect upon the menstrual cycle. Adrenal cortex hormone has been used to regulate the water-salt balance in premenstrual swelling and hyperemesis gravidarum.

Methods

The following methods[2] were employed to study the hormone excretion during the menstrual cycle, using both normal women and women showing functional disturbances of menstruation.† Urine specimens were collected from 7:00 P. M. to 7:00 A. M., since it has been shown by a number of workers that the excretion of hormones is uniform over the 24-hour period within limits of experimental error. Urine samples were extracted and separated into keto-steroid and estrogenic fractions by the method of Gallagher et al.[3] Estrogenic activity was assayed by the vaginal smear technic, injecting mice with an aqueous suspension of the material stabilized with glycol stearate as described by Gustavson.[4] The polycyclic ketones in the keto-steroid fraction

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*From the Students' Health Service, University of Minnesota.

Assistance in the preparation of these materials was furnished by the personnel of the Works Project Administration, Official Project No. 165-1-71-124, Sub-project No. 355.

†The assays were done by the department of physiology under the direction of L. T. Samuels, Ph.D.

were determined in the main by Holtorff and Koch's method of continuous extraction, using carbon tetrachloride.[5] Biological assays, using capons, were done to check certain samples. Sodium pregnanediol glucuronidate analyses were done by the method of Venning[6] and a number were checked by the estimation of glucuronic acid. As has been pointed out by Venning, considerable losses occur when separating small amounts of this material. Since no correction for this loss has been made in our data, the values must be looked upon as relative rather than absolute.

The hormone excretion during at least one menstrual period was followed before any hormone was injected. After a control record was obtained, a time was selected during the next menstrual period at which it was felt that a significant change in excretion might be recognized and a single dose of the hormone was given at this point. The excretion was followed throughout this menstrual period and in most cases for one menstrual period following that in which the injection was made.

The substances injected were progesterone in oil in 10 mg. doses,‡ gonadotropic hormone of mare's serum, 30 Corner units;§ alpha-estradiol benzoate 10,000 R.U.,¶ all being administered intramuscularly; and anhydrohydroxy progesterone 60 mg. orally.**

RESULTS

As in Gustavson's studies[4] of the normal untreated individual, there were two peaks of estrogenic substances, one appearing during the first half of the cycle at about the time of ovulation, and the other during the luteal phase. Our findings differ from Gustavson's in showing a more regular occurrence of the peaks with reference to the menses, and in a more continuous excretion of estrogenic substances during the cycle. Since our samples were each a composite of forty-eight hours excretion, absence of hormone on a single day would have been missed. At no time was there a period of more than two days in which estrogens were not excreted. From these studies a consistency in the timing of the hormone peaks during a given menstrual cycle was found to be repeated in subsequent cycles of the same individual. The variations in the hormone excretions in the normal woman are correlated with the changes in the genital system, indicating that the end products in the urine correspond to the changes in levels produced in the general circulation during the menstrual cycle (fig. 1a).

The injection of progesterone produced an increase in the output of pregnanediol. In the four cases who were given a single injection of 10 mg. of progesterone and one who was given 18 mg. in divided doses a considerable proportion of the injected progesterone was recovered (fig. 1b, 2). These results agree with those of Venning[7] and Buxton[8] and indicate that injected progesterone is metabolized the same as the progesterone produced in the body itself. There was, however, no change in the excretion of the estrogens or keto-steroids following the injection of progesterone. It appears, therefore, that the increased estrogens of the second half of the cycle do not originate from, nor are influenced by progesterone. Restoration of the complete menstrual cycle requires the injection of estrogens as well as progesterone during the second half of the menstrual cycle.

The injection of gonadotropic hormone of pregnant mare's serum increased the output of estrogenic substances but did not affect progesterone output in the dosage used. The follicle stimulating effect therefore seems to be more easily produced in women than the luteinizing action (fig. 1c).

Injection of alpha-estradiol benzoate also increased the output of estrogenic substances in a patient with a secondary amenorrhea of five years standing. Pelvic examination in this patient revealed a uterus about two centimeters in length, the adnexa were not palpable, but the vagina was normal. Urine assays before treatment showed a low estrogen output. Following the injection of 20,000 R.U. of progynon B for sixteen days, the patient began to flow and the injections were discontinued (fig. 3). This was not withdrawal bleeding and might indicate the raising of the estrogen level just enough to produce a flow, or it might indicate a hyperplastic endometrium. Because of the extremely small uterus, a curettage was not attempted.

Anhydro-hydroxy progesterone given orally did not increase the output of pregnanediol (fig. 4). A daily dose of 60 mg. was given for one week premenstrually to this patient for dysmenorrhea. The menstrual symptoms were not relieved in this case.

ANOVULATORY BLEEDING

We now recognize *anovulatory* bleeding in women. The discovery of anovulatory bleeding in monkeys indicates that estrin alone would account for menstruation. Markee[9] transplanted small pieces of endometrium in the anterior chamber of the eye in monkeys. He found no difference in the process of menstruation whether ovulation occurred or not. The actual cause of the uterine bleeding was due to the regression of the endometrium. An increased fragility of the capillaries followed the marked coiling of the spiral vessels. A disproportion between the length of these vessels and the thickness of the endometrium indicated that menstrual flow occurred whenever a regression of the uterine mucosa took place. He concluded that the *progestational* stimulation of the endometrium was not necessary.

However Daron[10] found the endometrium to differ in anovulatory bleeding from normal menstruation. In the former, the coiled arteries were not at the surface and the terminal arterioles were intact, whereas, in the ovulatory menstruation the surface arteries were completely occluded.

In two cases of sterility we observed a single estrogen peak instead of the normal double peak (fig. 2) and believe that it may represent anovulatory bleeding. Endometrial biopsies should be done to substantiate such a conclusion.

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‡Supplied as Proluton by the Schering Corporation, Bloomfield, N. J.

§Supplied as Gonadogen by the Upjohn Company, Kalamazoo, Mich.

¶Supplied as Progynon-B by the Schering Corporation.

**Supplied as Pranone by the Schering Corporation.

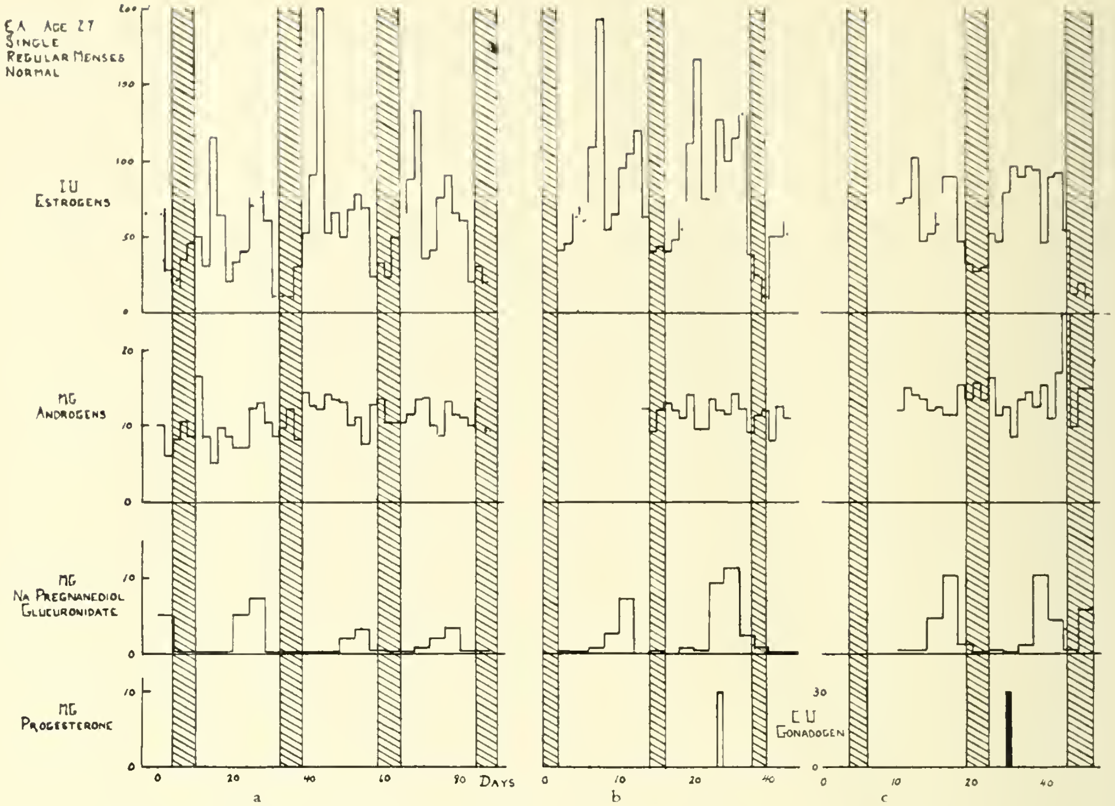

Fig. 1. Normal Menstrual Cycle. (a) Untreated, (b) Progesterone injections, (c) Mare's serum injections. Shaded areas indicate menstruation.

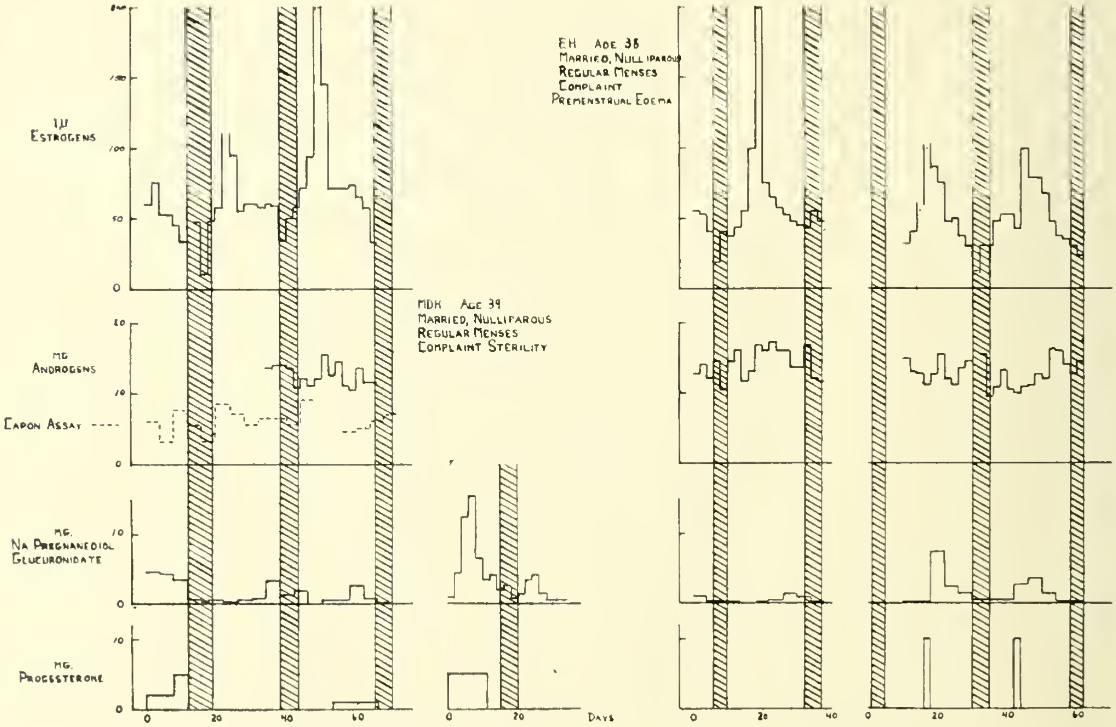

Fig. 2. Menstrual cycles with single estrogen peaks. Shaded areas indicate menstruation.

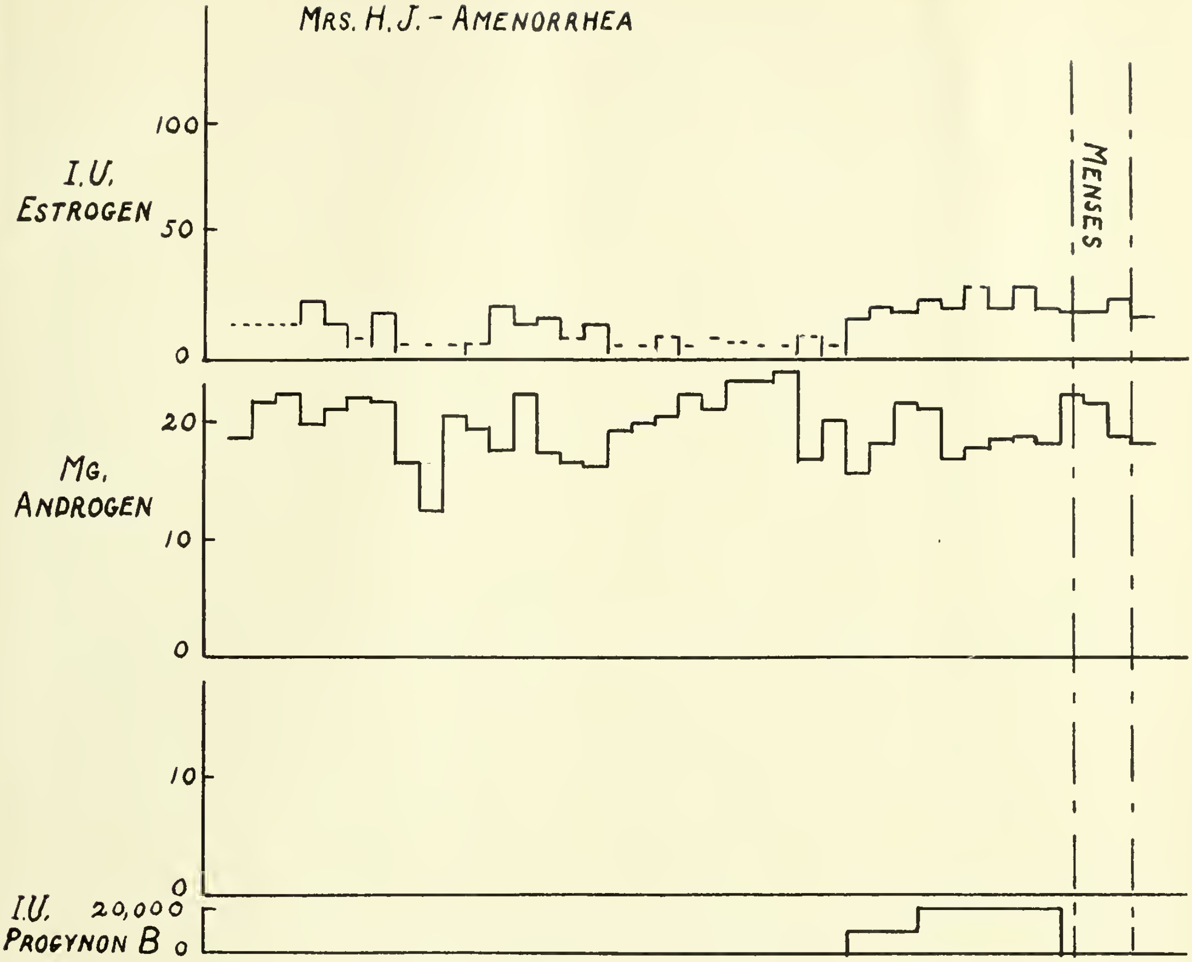

Fig. 3. Estrogen injections in secondary amenorrhea.

Effects of Estrogens and Progesterone

Gillman[11] found that a single dose of estradiol benzoate given to women in the first part of the cycle altered the normal menstrual sequence. The effect depended upon the dosage and the sensitivity of the woman to estradiol. He got both a shortening and a lengthening of the cycle. In the former, after a period of estrogen inhibition of the ovary the estrogen threshold is lowered and bleeding occurs. In the latter, the ovary recovers before bleeding occurs and a normal cycle follows the inhibited one. Inhibition of the ovary occurs in either case. Withdrawal bleeding after estrogens are given occurs from five to eleven days after the estrogens are discontinued.

Gillman gave estradiol in gradually increasing amounts and concluded the existence of estrogen-sensitive and estrogen-resistant women. For *one* a dosage of 0.5 mg. may be a large dose, and for another 5 mg. may be inadequate. Hyper-estrogen bleeding may occur if the dose is large or the patient estrogen-sensitive. The cycle is postponed by inhibition of the ovaries which continues as long as estrogen is administered.

Gillman[12] also showed that after giving progesterone in the first part of the cycle in sufficient quantities the cycle was shortened. It was suggested that intracyclic bleeding might be due to a sudden rise in progesterone with a sudden fall of the level. Mid-cyclic bleeding, or the so-called ovulation bleeding, may be due to abnormal relation of the estrogens and progesterone. The giving of progesterone produces withdrawal bleeding in forty-eight hours. Normal menstruation involves both factions even though bleeding may be artificially produced, and there appears to be an optimum level between the estrogens and progesterone.

Hisaw et al[13] found experimentally that both the follicular and luteal phase endometrium could be produced by administering estrogen and progesterone respectively. If treatment is continued for more than twenty-five days, the glands enter a state of secretory exhaustion. There appears to be a synergistic action of estrogen and progesterone on the uterus of the monkey.

Hisaw and coworkers[14] have shown that when a priming dose of estrogen is given followed by the simultaneous administration of estrogen and progesterone for twenty days or longer a larger uterus results with more complete development of the endometrium than when either hormone is given alone.

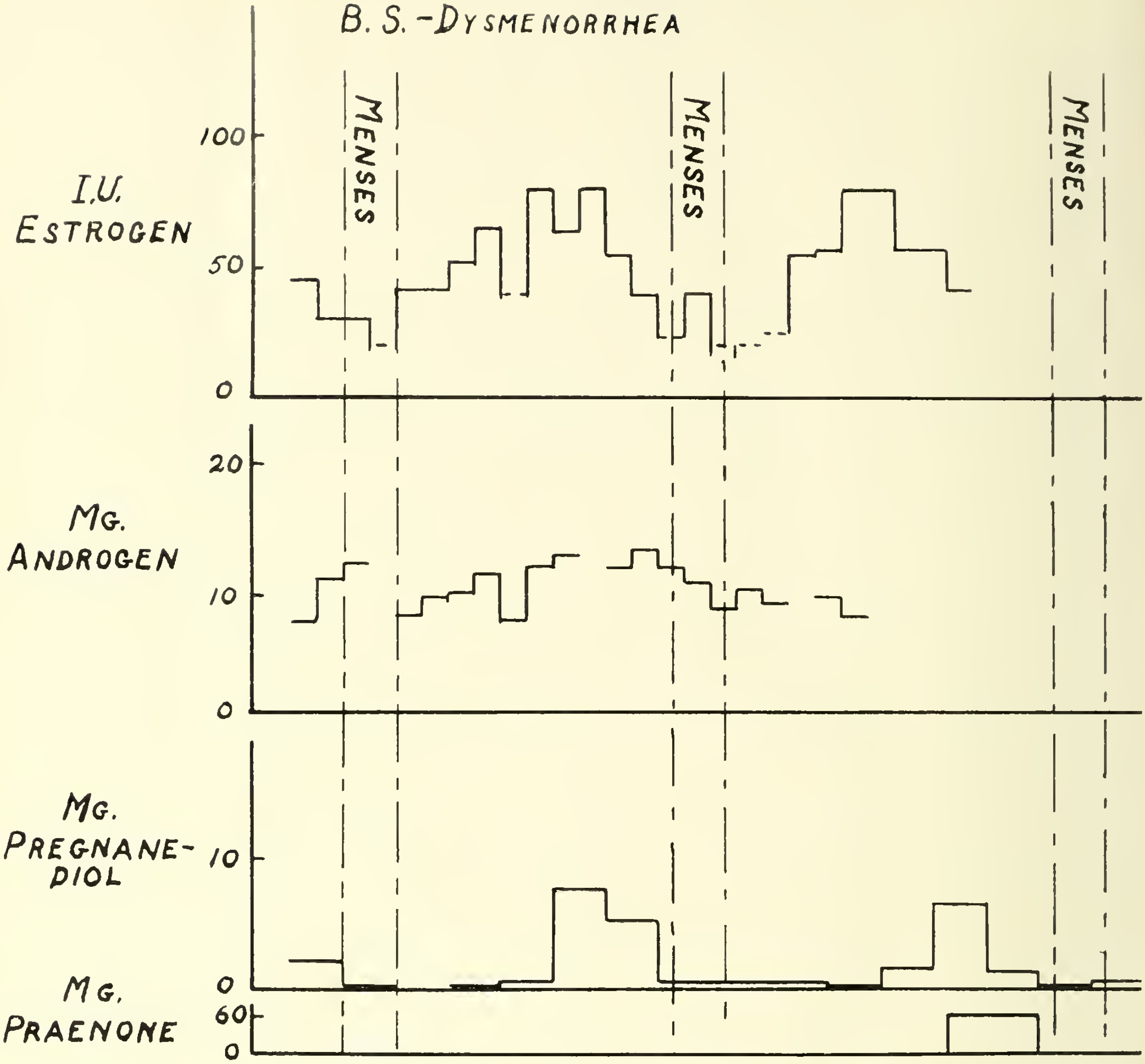

Fig. 4. Dysmenorrhea treated with anhydro-hydroxy progesterone (prænone).

DYSMENORRHEA

Abdominal pains, backache, legaches, headaches, premenstrual tension, fainting, nausea and vomiting associated with menstruation are included in the symptom-complex designated as dysmenorrhea.

The cause of primary dysmenorrhea is unknown. The occurrence of symptoms in alternate months in some individuals suggests a possible endocrine factor.

Fluhmann studied the estrogenic hormones in the blood and found eighteen out of nineteen women studied were within normal limits.

A number of theories of the endocrine factors in dysmenorrhea have been disproved by Fluhmann:[15]

1. *Deficiency of estrogen*: The association of dysmenorrhea with hypoplasia uteri and oligomenorrhea might indicate a hypo-ovarian function. Fluhmann found blood levels of estrogen were normal in dysmenorrhea. Also hypoplastic uterus is uncommon and may be present without dysmenorrhea.

2. *Excess estrogen or deficiency of progestin*: A hyperplastic endometrium with overproduction of estrogen is not accompanied by pain. Peak of estrogen concentration is at midperiod when there is seldom any pain. The corpus luteum undergoes degeneration two to three days before menstruation.

3. *Excess of progestin*: No evidence that excessive doses of progesterone leads to abnormal desquamation of the endometrium has been found, according to Fluhmann.

Of the 7,379 women who entered the University of Minnesota in the past four years, 20.6 per cent complained of menstrual discomfort sufficient to necessitate going to bed. Of these, 2.6 per cent were confined to bed every month. A hundred of the 20.6 per cent between the ages of 17 and 25 all with primary dysmenorrhea were studied.[16] A general physical examination including a pelvic or rectal examination and basal metabolism rate was done. Fifty of the group were given estriol glycuronide tablets (Emmenin) during the latter half of the cycle and the other fifty were given placebo tablets indistinguishable from the Emmenin tablets. Twelve per cent of the group receiving estriol glycuronide and 8 per cent of those receiving placebos reported complete relief for a period of nine to twelve months. Thirty-eight per cent received partial relief in the estriol glycuronide group and 34 per cent in the placebo group. No relief was obtained in 52 per cent of the former group and 58 per cent in the placebo group. This past year another control study has been under way, giving anhydro-hydroxy progesterone orally and progesterone, intramuscularly. The results of this study will be reported at a later date.

One should not become discouraged by the present results of the administration of hormones. We should continue to study the effects both by urinary assays and clinical response. It may be that a combination of hormones will prove more effective. However the results of hormones as with thyroid extracts will probably be only substitution therapy, but even a temporary relief will be appreciated by those who are confined to bed every month because of dysmenorrhea.

CONCLUSIONS

1. The process of menstruation is under the control of a complex endocrine mechanism which is not completely understood at the present time.

2. Whether anovulatory bleeding is a normal menstrual process or an abnormal condition is still debatable.

3. The results of hormone assays of the urine indicate that: (a) Gonadotropic hormone from pregnant mare's serum increases the output of estrogen but does not effect the excretion of pregnanediol (the end product of progesterone); (b) the administration of progesterone increases the output of pregnanediol but does not influence the output of estrogen; (c) the administration of anhydro-hydroxy progesterone, orally, does not increase the output of pregnanediol; (d) there is no correlation between the estrogen and pregnanediol levels and the symptoms of dysmenorrhea.

4. A control clinical study indicates that the benefits from the use of estriol glycuronide in the treatment of dysmenorrhea were no greater than with placebo. A control study is needed in the evaluation of therapeutic measures where the psychogenic factors are important.

5. A combination of the estrogen and progesterone given concurrently may give better results even though only temporary.

6. Further study of the endocrine-menstrual relationship is recommended.

REFERENCES

1. Fluhmann, C. F.: Am. J. Obst. & Gynec. (Oct.) 1936.
2. Samuels, L. T., Winther, Nora, and Yolton, Naomi: J. of Clin. Endocrinology 1:2, 1941.
3. Gallagher, T. F., Peterson, D. H., Dorfman, R. I., Kenyon, A. T., and Koch, F. C.: J. Clin. Investigation 16:695, 1937.
4. Gustavson, R. G., Mason, L. W., Hays, E. E., Wood, T. R., and D'Amour, F. E.: Am. J. Obst. & Gynec. 35:115, 1938.
5. Holtorff, A. F., and Koch, F. C.: J. Biol. Chem. 135:377, 1940.
6. Venning, E. H.: J. Biol. Chem. 119:473, 1937.
7. Venning, E. H., and Browne, J. S. L.: Am. J. Physiol. 123:209, 1938.
8. Buxton, C. L.: Proc. Soc. Exper. Biol. & Med. 41:284, 1939.
9. Markee, J. E.: Anat. Rec. 70 (Suppl. 3) 54. 1938.
10. Daron, G. H.: Am. J. Anat. 58:349, 1936.
11. Gillman, J.: J. Clin. Endocrinology 2:146, 1942.
12. Gillman, J.: J. Clin. Endocrinology 2:161, 1942.
13. Hisaw, F. L., Greep, R. O., and Fevold, H. L.: Am. J. Anat. 61:483, 1937.
14. Hisaw, F. L., and Greep, R. O.: Endocrinology 23:1, 1938.
15. Fluhmann, C. F.: Menstrual Disorders; Philadelphia, W. B. Saunders, 1939, pp. 270-271.
16. Boynton, R. E., and Winther, N.: J.A.M.A. 119:122, 1941.

Irregular Shedding of the Endometrium*

J. L. McKelvey, M. D.
Minneapolis, Minnesota

MUCH attention has been accorded the metrorrhagias and those disturbances of menstruation itself, the menorrhagias, which are associated with gross and readily demonstrable pathology. It is only recently that much work has been done on the functional disturbances of menstruation. Much of this has been the study of related disease and of the endocrinologic background. It cannot be too much stressed that these functional menorrhagias are due to a variety of conditions and are not a single entity. Without adequate histologic control, attempts to interpret other findings are bound to lead to confusion. It is extraordinarily unlikely that such different lesions as localized hyperplasia, localized vascular disturbances, functional hypertrophy and irregular shedding should have a common etiology. The most reliable tool available for study of the menorrhagias is histologic control. It is true that this involves the study of an end organ response which is due in many instances to a functional disturbance elsewhere. But at least it allows of accurate classification of the disturbances when study of etiology may proceed in an orderly manner. The histology of endometrium and ovary is gradually falling into line with endocrine assay and clinical history. While only the threshold of the subject has been reached, some interesting and practical information has already been turned up.

That functional menorrhagia about which most is known is irregular shedding. An increase in quantity and duration of the menstrual flow is found to be associated with evidence of prolongation of endometrial shedding, retention and attempts at involution of endometrium which has undergone progesterone produced change, interference with surface epithelialization and a resultant irregularity of the new proliferation phase endometrium of varying degree. It is essentially a prolongation of shedding with an abnormal degree of retention of endometrium which has functioned.

It should be noted at the very beginning that the endometrium in this condition ultimately heals itself sooner or later. Thus there may be expected a series of histologic pictures whose details are dependent upon the stage of the process at which the endometrium is taken. This must be related to the inherent degree of the abnormality.

It is also clear that the diagnosis can only be made by obtaining material for histologic examination at a suitable time. By and large, the diagnosis cannot be made from endometrium of the non-bleeding interval. Nor can it be made with a suitable degree of accuracy from that taken during the first two or three days of the bleeding. From the fifth day on, it becomes progressively simpler. The histologic diagnosis is based upon two main considerations. These are comparison with the endometrium of a similar day of normal menstruation and recognition of abnormal retention and involution of endometrium which has undergone progesterone effect.

The literature dealing with the condition is scanty and the usable portions of it are almost entirely those which have to do with histologic details. Driessen presented a vague description of the condition in women near the menopause and girls at the menarche. He recognized the similarity to irregular shedding seen after incomplete abortion with poor regeneration. He thought that the bleeding was due to retention of tissue and advised its removal. The histological picture was not clearly recognized and it was confused with cystic glandular hyperplasia and other conditions.

Pankow described disturbances of regeneration after menstruation. He recognized the fact that the tempo of the cycle was not disturbed but that one bleeding might last almost until another began. He reported improvement after curettage and described three cases in which spontaneous cure occurred.

Kaufman and Hoeck described seven cases. Baniecki described sixty-one cases. Rockstroh restudied the material above and described further cases. Robert Meyer published short descriptions in 1929 and 1931. Traut and Kuder described the condition and coined the term irregular ripening. Other descriptions were given by Hamblen and Wilson and Kurzrock.

The condition is not uncommon as manifested by the fact that twenty-five cases were encountered in the University of Minnesota Hospital in a six months period. It occurs with an increasing frequency with advancing age within the period of sexual activity. The greatest incidence occurs between the ages of 30 and 50. About one-third complain of profuse bleeding and two-thirds of prolonged bleeding although in the former the duration is at least somewhat increased. The bleeding may persist for large portions of the twenty-eight day cycle. In the group studied, the bleeding lasted for six to eight days in seventeen patients, nine to ten days in two patients, ten to fifteen days in eight patients and in nine patients it persisted for more than fifteen days. There is no evidence of a significant variation in the duration of the cycle. Similar histologic findings are not uncommon in the menorrhagias which often occur at the first few menses after delivery or abortion. One interesting case presented a prolonged history of menorrhagia which was shown histologically to be irregular shedding. The condition recurred, to abruptly end in a metrorrhagia which was shown histologically to be due to endometrial hyperplasia.

Any description of the endometrium of irregular shedding will of necessity involve comparison with the nor-

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*From the departments of obstetrics and gynecology and physiology, University of Minnesota.

This investigation was supported in part by funds donated by the Upjohn Company.

Assistance in the preparation of these materials was furnished by the personnel of the Works Project Administration, Official Project No. 165-1-71-124, Sub-project No. 355.

mal process of shedding. This brings up the question of standards for the normal. A dogmatic answer is hard to give within reasonably narrow limits. Schroeder's original description of a shedding by tissue loss which was almost complete in twenty-four and entirely complete in seventy-two to ninety-six hours has been called into question from a number of points of view. It is now recognized that normal menstrual shedding is not sudden or exactly similar in all areas of the uterine cavity. Small necrotic areas may be shed over the course of two or three days. Areas about the tube openings tend to be more slowly shed than the remainder. All levels of the endometrium do not become necrotic at once. Even in a single layer, shedding is not sudden or necessarily continuous.

It can be agreed with Schroeder that, for the most part, the endometrium which has functioned is fairly cleanly cast off at menstruation. The most common exception to this is that part of the endometrium immediately adjacent to the basalis where portions of functionalis may remain. In such circumstances, epithelial regeneration occurs from gland epithelium which has functioned as well as from that which has not. Involution of epithelium which has functioned must be accepted as occurring. This epithelium returns to the regeneration form and tâkes part in epithelial regeneration. Predecidual and decidual stroma can do likewise. This has cast some doubt upon the reality of extensive tissue loss at menstruation. Van Dyke and his coworkers have shown a striking loss of fluid from the endometrium at about the time of the onset of menstruation. Histological evidence of shrinkage of cells and tissue is readily available. The thinning of the endometrium may be said to be due to a combination of water-loss by the retained tissue and tissue shedding. This cell shrinkage is part at least of the process of involution and change from secretion phase to regeneration phase character in retained stroma and epithelium which have functioned.

After menstruation, the epithelialized surface may remain irregular. In the thicker areas, the glands are not of the simple basal type but show evidence of having functioned. Even necrotic areas may be retained. This occurs particularly in elderly women. They may be seen in curettage specimens taken on the eighth to the tenth day of menstrual bleeding. These represent transitional stages between normal menstruation and irregular shedding. They may be localized and not diffuse findings.

Features somewhat similar to normal menstrual shedding as described above are seen in this condition of irregular shedding. Again, transitions between the normal and the abnormal occur. Menstruation begins at the expected time. The surface epithelium and the compacta are shed, but the rest of the mucosa remains in high function for varying periods. Both stroma and glands show evidence of function similar to that of the first day or two of normal menstruation, in spite of the fact that bleeding has been prolonged. It appears as though menstrual destruction had begun only to almost completely cease. Gradually, more of the endometrium is cast off and tissue contraction and involution of the remaining mucosa set in. Ultimately, healing takes place, though this may be postponed until another menstruation is about to begin. Bleeding of course continues until epithelialization is complete.

The histological diagnosis will depend upon characteristics which vary with the stage of the process at which the material is obtained. From the very nature of the condition, it is obvious that a diagnosis can only be made from material obtained during the bleeding phase. The peculiar habit of attempting to study menorrhagia by obtaining endometrium in the interval between bleedings is widely established in circles where it should not be. This perhaps explains the tardiness of the development of knowledge of the condition.

Endometrium taken on the first or even the second or third day of the bleeding may be impossible or very difficult to differentiate from normal menstrual endometrium. A similar statement might be made in regard to material obtained at the very end of the bleeding though this is seldom encountered. Since the histologic diagnosis depends in part upon recognition of the persistence for abnormal lengths of time of conditions closely resembling the normal at a much earlier period, the time of curettage should be carefully chosen in relation to the onset of bleeding and to the history of its previous duration. The most desirable period is from the eighth to the tenth day, if the bleeding is expected to last longer. Obvious adjustment should be made where the history of bleeding is shorter.

It is also clear that an accurate history and a careful statement of the duration of the present bleeding episode when curettage was done should accompany all endometriums to the histologist. Particularly, where irregular shedding is suspected, is this essential.

The details of the histologic findings can best be made clear in the demonstration of the material itself but a short description might be given here. It has been pointed out that not only does this condition represent a slowing of the process of menstrual shedding, shrinkage, involution and regeneration but that it eventually passes through these phases to healing. It is to be concluded that the picture will vary according to the extent of advance of these processes.

The endometrium of an irregular shedding taken, shall we say, on the fifth day of a prolonged bleeding is likely to show the characteristics of menstrual endometrium toward the end of the first twenty-four hours. The mucosa is still thick. The surface epithelium and compacta have been shed. The stroma cells are loose and large. Much intercellular fluid is still present and shrinkage is slight. The vessels are dilated. The epithelial cells have clear cytoplasm and histochemically demonstrable glycogen is present. Most of the glands are still dilated and open by wide mouths on the surface. The epithelial margin of the gland lumen is rough and the gland itself retains its tortuosity. One of the striking features is the absence of surface epithelium anywhere in the material. Only gland epithelium is to be seen.

Taken a little later in the course of the bleeding, the mucosa will be found to have lost more of its functioning layer. Some necrotic masses may still be adherent to the surface. No surface epithelium is present. Some of the glands have contracted and collapsed to form star-shaped structures. Others have undergone various degrees of involution, becoming straight and lined by epithelium which shows transitions between those characteristic of function and of proliferation. Vessels have contracted and part of the stroma has shrunk while in other areas, it remains loose. This process is likely to be more advanced in some areas than in others.

Still later in the course of the bleeding, the endometrium will show larger proportions in involution and regeneration. Portions of the surface epithelium are replaced. An impression of irregularity of the regeneration is given. Clear evidence of the persistence of stroma and epithelium which has functioned may be obtained. Gradually, complete healing is achieved.

An irregular or non-diffuse form occurs and is somewhat more difficult to describe. This type may be seen in the first few menses after abortion or delivery but in other circumstances as well. Similar changes occur to those described above but there is a wide variation of the advance of shedding, involution and regeneration in different areas. One is given the impression that retention of endometrium which has functioned in scattered areas is interfering with the regeneration as a whole, with the production of an irregularity of regeneration of the whole membrane. Again, surface epithelium will be absent. Involution and regeneration is scattered but more advanced than in comparable time periods in the diffuse form. Both epithelium and stroma shows clear evidence of function in various stages of involution. It is altogether likely that these forms differ from one another only in degree.

Scattered round cells are found in these endometriums. They tend to appear in increasing numbers as the duration of the bleeding is greater. Insofar as it is not physiological, this round cell infiltration is secondary to the bleeding. Chemical barriers to the upward spread of infection from the vagina are broken down by the buffered blood. A similar picture is seen in all conditions associated with prolonged uterine bleeding.

It should also be stated that these endometriums show no evidence of the presence of any other of the known functional disturbances. In particular, sufficient numbers have been carefully examined to justify the conclusion that the condition has nothing in common with cystic glandular hyperplasia.

There are various reports in the literature dealing with the endocrine status of patients with irregular shedding. None of these are satisfactory since they have almost all been based upon biologically determined quantitative assays of occasional blood specimens. There is such wide variation in the production of these hormones at different periods in the cycle and from individual to individual that single or occasional specimens are almost impossible to interpret.

A study of the endocrinological background of irregular shedding has been carried out by Dr. L. T. Samuels of the Division of Physiological Chemistry of the University of Minnesota. A small series has been completed and will be reported in detail elsewhere. These have all shown similar findings. They have all been carried out over at least one complete cycle. Urinary estrogens, androgens and pregnanediol have been quantitatively assayed. Estrogen and androgen levels have shown normal values. Pregnanediol continues to be excreted after the onset of menstruation. This has not been observed in any other naturally occurring condition but has been observed to occur following artificial exhibition of progesterone and of pregnant mare's serum gonadotrope. Further work will be required before these findings can be accurately interpreted. It can, however, be said that irregular shedding is characterized by an abnormal prolongation of the excretion of pregnanediol, the end product of progesterone metabolism. It appears, then, to be an endocrinologic as well as histologic entity.

Associated pelvic pathology is not infrequently seen. In 36 patients who were adequately studied and of whom 27 have been carefully followed for from six months to two years, there were found two with pelvic inflammatory disease, two with surgically proven uterine myomata, four others with clinically diagnosed myomata and four with retroversions of the uterus. Again, this must await further experience for evaluation.

Specific treatment must await an adequate explanation of etiology. Reports of the effects of the exhibition of estrogen are not convincing and this has not been adequately tested. Of 26 of the 27 adequately followed patients noted above, 12 showed a return to normal menses following curettage alone. A further four showed no effect from curettage and were not treated further. Another four who continued to have menorrhagia and who were in menopausal age, were satisfactorily treated by X-ray sterilization. Eight were treated surgically. Two of these had myomata and one an endometrial polyp. The remaining five were treated surgically because of recurrent severe bleeding after curettage and contraindications to X-ray sterilization. Thus about half of the patients responded to curettage and half to surgery or X-ray.

Irregular shedding of the endometrium would seem then to represent a clinical entity which is of frequent occurrence and which must be reckoned with in our understanding of the menorrhagias. In its broader sense it appears to demonstrate again that the histologic approach to disturbances of the menstrual cycle is still the most fruitful direction of attack and that accurate handling of this tool is essential to the adequate study of the gynecological patient.

Relation of Sex Hormones to the Climacterium

Della G. Drips, M.D.†
Rochester, Minnesota

ZONDEK gave the first fairly clear picture of the changes taking place in the ovaries and anterior lobe of the pituitary body during the climacterium or period of physiologic ovarian failure. He arrived at his conclusions from clinical observations, histologic studies of the reproductive organs and attempts at quantitative determinations of the ovarian follicular and anterior pituitary gonadotropic hormones present in the blood and urine of women during this period. He divided the climacterium into three periods and, as the investigative work of the past ten years has not changed this conception materially, it would seem well to reconsider it in this way.

The first is the period of corpus luteum failure, when the ovary can no longer respond in the normal manner to the stimulus to ovulation and luteinization and so fails to produce normally functioning corpora lutea and sufficient luteal hormone to balance the follicular or estrogenic hormone produced by the graafian follicles. Unable to rupture, the follicles become cystic. These may become partially luteinized. Poorly formed corpora lutea or none at all are observed.

During this period, estrogenic hormone is often present in the urine in larger amounts than is usual during normal menstrual function. When such large amounts of estrogenic hormone are present with decreased amounts of luteal hormone, the uterus is frequently found to be larger and softer than normal and curettage or endometrial biopsy reveals what Zondek called a hyperplastic endometrium or a persistent proliferative phase of the endometrium. Cystic glandular structures may be present. There may be some areas of differentiation into secretory glands or none at all. Menstruation is more profuse and prolonged and uterine bleeding may occur between menstrual periods. Clinicians refer to such a physiologic status as the menometrorrhagia of the menopause. Women may experience fewer of the menstrual molimina during this period and have an increased sense of well-being unless the flow is profuse enough to produce secondary anemia.

The anterior pituitary gonadotropic hormone is most often present in normal amounts as there is still sufficient estrogenic hormone to prevent hyperfunction of the pituitary body.

During the second period the follicles fail to respond to the follicle stimulating hormone of the anterior lobe of the pituitary body and less estrogenic hormone is found in the blood and urine. Cystic ovaries are less common, the uterus becomes smaller, the vagina is not as succulent, the external genitalia and breasts begin to decrease in size, the menstrual flow becomes scantier and the periods farther apart. There may be an aggravation of menstrual molimina and a decreased sense of well-being. Molimina may occur without menstruation. The woman usually begins experiencing the so-called hot flushes. These vasomotor disturbances seem to reach their height during the first year after the cessation of the menses. At least the greatest number of women report for treatment during this period. Studies made to determine the amounts of gonadotropic hormone present in the blood and urine during this period show these to be increased. There seems to be some evidence that the severity of the vasomotor disturbances has some relationship to the excess of gonadotropic hormone present. It is often necessary to make at least three quantitative determinations of hormone on twenty-four hour specimens of urine or to pool several twenty-four hour specimens of urine to get some idea of the excess of hormone present in each case and the end-point must be reached in such determinations. There is considerable variation in the amount of hormone from day to day. The amount of gonadotropic hormone in women with hot flushes is so consistently higher than the usual maximal amount in normally menstruating women without vasomotor disturbances that we at the Mayo Clinic have come to accept more than 25 rat units to a liter of urine as an evidence of some ovarian failure. Women with normal menstrual function usually do not have more than 20 rat units to a liter of urine, according to the present method of determination, at any time in the cycle. During the female climacterium, if the first urinary extract tested gives a positive result when tested for amounts from 25 to 66 rat units per liter, it is a waste of time and animals to continue to the end-point in the routine clinical tests. If the results with the first urinary extract are negative for excessive amounts, the test must be repeated on at least three twenty-four hour specimens to be at all sure of what is going on. The method of extraction and the biologic procedure have been published.[2] Amounts as high as 250 rat units to a liter with the quantitative method which we use have been obtained during the climacteric period. Both follicle stimulating and luteinizing factors are present but the follicle stimulating factor predominates. Heller and Heller have reported "a definite correlation between gonadotropic hormone and the presence or absence of the menstrual cycle in women of menopausal age." They stated that "a twenty-fold increase in gonadotropic potency occurs at the time of the climacterium. This increase develops in a relatively short time—probably two to ten years."

The amounts of estrogenic hormone in the blood and urine vary greatly during this period. As a rule they are definitely decreased, but I have reported[1] a group of cases in which there was a scanty menstrual flow and increased menstrual molimina such as nervous irritability, soreness of the breasts, pelvic discomfort and headache, with hot flushes at midcycle or with the menses. In these cases the patients were found to have large amounts of estrogenic hormone at midcycle but the gonadotropic hormone was present in excessive amounts. These women were still having rather regular periods. All were about forty years of age but there is no doubt from the clinical symptoms and from the excess of gonadotropic hormone in the urine that they were in the second period of the menopause. Apparently, a previous temporary ovarian failure had stimulated the anterior lobe of the pituitary body to increased gonadotropic function and this had in turn stimulated the ovaries to increased temporary function

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†Section on obstetrics and gynecology, Mayo Clinic.

This interaction between the ovaries and the anterior lobe of the pituitary body goes on until the ovaries can no longer respond at all at any time. Menstrual molimina may occur regularly for a time after the menses have ceased. Finally, the woman is no longer conscious of having cycles; the vasomotor disturbances are persistently present, reach a climax and then diminish in intensity, and in the majority of cases they cease entirely. As a rule, the gonadotropic hormone is not found in increased amounts after the vasomotor disturbances cease. In some cases there is an excessive amount, which is confusing. Perhaps some psychobiologic adjustment takes place in these women that so far remains obscure. In other women it would appear as if the flushes persist even after the hormone titer drops. Many more determinations of hormone are necessary to substantiate this. A few women have a symptomless menopause. This is apparently a pituitary menopause. The pituitary body may fail before the ovaries or may be unable to produce an excessive amount of gonadotropic hormone in response to the ovarian failure. Pituitary failure seems unassociated with vasomotor disturbances at any age. In cases of primary pituitary failure, gonadotropic hormone is usually not demonstrable in the urine and the estrogenic hormone is decreased or absent, depending on whether or not the failure is partial or complete.

Finally, the third period supervenes. This is the period during which the atrophy of the accessory organs, the result of the lack of estrogenic hormone, may become pronounced. Some estrin may still be demonstrable in the urine but it is not in a sufficient amount to delay these changes. The amount of gonadotropic hormone may still be large and vasomotor disturbances still may be present but the woman who presents herself for treatment of the atrophic disturbances often has not had hot flushes for a long time and the amount of gonadotropic hormone is not increased. Pruritus vulvae, atrophic vaginitis, leukokraurosis, kraurosis rouge, and leukoplakic vulvitis are all manifestations of this third period.

The time that each of these climacteric periods persists varies considerably with each individual. The first period usually covers one or two years and occurs oftenest about the middle forties. The second period may last a number of years. The menses cease during this period, usually between 48 and 50 years of age, but the vasomotor disturbances may go on for several years more. The third period naturally lasts the rest of the woman's life although treatment will to some extent ameliorate the symptoms associated with the atrophy and in some cases the atrophy is unassociated with symptoms.

The climacterium or ovarian failure may occur at any age. The failure, however, in younger women is frequently not complete but this may only mean a prolonged first or second period. One does not speak of the climacterium in the case of these younger women but designates the condition as primary ovarian failure, hoping always that some treatment will make the ovaries function more normally and that the menstrual periods will not cease.

It might be well to review here just what is meant by the vasomotor disturbances of the climacterium. Zondek described "klimakterische Wallungen," which apparently correspond to what is termed "hot flushes" but "waves" is a better term for it implies more than a sensation of heat. In some cases the waves may be unaccompanied by heat but all the other accompaniments may be present. In most cases the wave is initiated with a general sensation of chilliness or cold and a feeling of oppression as though something untoward were about to happen. Faintness and air hunger may be present and there may be a peculiar sensation in the pit of the stomach. Then, tachycardia is noticed and is followed by a sense of fullness and tightness in the head, and finally, a sensation of heat spreads to all parts of the body and is followed by perspiration, which in turn is followed again by chilliness. Many women dread the chilly sensations more than they do the heat. Flatus is frequently passed during the wave and a sense of hunger may be present after the wave, as if the stomach had been rapidly emptied. Few or all of these sensations may be present with each wave. Occasionally, a woman will mention only one sensation. Perhaps she has experienced palpitation for the first time and has become heart conscious. Her fear of heart trouble possesses her and she mentioned only this. It is with difficulty that she remembers other sensations associated with the palpitation. Many of the neuroses of the climacterium seem to be built up in this way.

During the period, when the waves are most intense, women complain much of increased nervous irritability, restlessness, impairment of memory, inability to concentrate, disinclination to undertake new duties, easy mental fatigue, insomnia, and finally of simple depression. True vasomotor waves are more likely to be present during the night and on awakening in the morning. They occur frequently with meals. When a patient complains of hot flushes only during the daytime one should be suspicious of other than an endocrine cause. Aside from the disturbance of the night's rest with flushes, there is, also, often a true insomnia that may be difficult to control with treatment. Some women complain of paresthesia, such as numbness, or of gastrointestinal disturbances such as gas, bloating and looseness of the bowels. Arthralgia is common and urticaria and angioneurotic edema seem more frequent. Some women gain weight partly perhaps because of increased hunger sensations and increased appetite but even when increased appetite is not present. Shorr has called attention to fat deposits which are different from those seen earlier.

Because the thyroid gland enlarges with puberty and pregnancy, it has long been linked to the ovaries and there was a tendency to believe that it became hypoactive after ovarian function ceased, which might explain the increased weight. This hypothesis has not been substantiated. However, that the function of the thyroid gland is disturbed is suggested by the fact that toxic adenomas, exophthalmic goiter and true myxedema are more prone to occur at this age. Studies of the basal metabolism should be made during and after the menopause. The rate does decrease at times, perhaps because of fatigue from continued vasomotor disturbances or some psychic state. The fatigue and tendency to a low basal metabolic rate, not true myxedema, may have existed previously and been aggravated by the menopause. In such cases the patients feel much better when the basal metabolic rate is raised and held at a normal level with desiccated thyroid. They feel less tired. The nervous system seems to become more stable and as a consequence the vasomotor disturbances subside. Apparently a vicious circle has been broken.

Little is known as yet about the relation between the ovaries and the other ductless glands. Hamblen expressed the opinion that increased activity of the suprarenal cortex occurs with failure of the ovaries and hyperfunction of the anterior lobe of the pituitary body. "This," he said, "is responsible for the increased androgen titers characteristic of the climacteric and also for the fact that oöphorectomized women may excrete estrogens. The regressive changes in the sexual system which characterize the climacterium may be due more to the defeminizing action of increased androgens than to the decreasing levels of estrogens."

Sexual sensations in the majority of women apparently change very little during the climacterium. These apparently have to do with a complicated nervous mechanism not closely if at all linked to the endocrines.

Besides altered endocrine, psychic and nervous influences being responsible for many of the menopausal symptoms, one also has to consider aging and degenerative processes that begin about this time. This is especially true when the menopause occurs after the age of 50 years. Arteriosclerotic changes may manifest themselves and hypertension may develop. Referring to the symptoms of the menopause Shorr spoke of the complexity of the menopausal state and said that it has only been possible since the estrogenic hormones have been available to begin to distinguish the phenomena due to ovarian insufficiency from those which are a part of an even more fundamental rhythm in the life cycle of the species.

TREATMENT

The treatment of the menometrorrhagia of the first period of the climacterium is dependent on the amount and duration of the menstrual flow. A curettage is in order in any event to rule out a malignant lesion of the uterine fundus. After this, one may proceed with watchful waiting and, if necessary, later consider a menopausal dose of radium or roentgen rays. Either is very satisfactory in cases in which women are approaching 50 years of age. In the case of women ten years younger given a menopausal dose of radium there may be a recurrence of the menses and more treatment may be necessary. It is well to tell them that the treatment may need to be repeated. Some women prefer hysterectomy and now that vaginal hysterectomy can be very satisfactorily done with a short period of incumbency one is inclined to favor it, especially if the cervix is not in good condition.

Hormones are seldom used for the menorrhagia of this period and never without a diagnostic dilatation and curettage. In the case of younger women, when one wishes to conserve ovarian function, the administration of luteal hormone or progesterone during the luteal phase of the cycle and again during menstruation has been of help, as have injections of preparations of chorionic gonadotropin and the androgens. Even the estrogens, particularly stilbestrol, given in fairly large doses for a short time during the periods of bleeding, will often bring about a cessation of the flow in five to seven days. The administration of the hormone should then be stopped, for if continued, although it may postpone the next menstruation, when this does ensue it will be more profuse than at any previous period. Just how stilbestrol effects a cessation of the menstrual bleeding in these cases is hard to understand. Many of these younger women have cystic ovaries with sufficient urinary estrin and a proliferative endometrium.

It is the symptoms of the second period or the true menopause when the menses cease that have been most satisfactorily treated with hormones. With the administration of estrogenic hormone in sufficient doses the distressing hot flushes, and the associated symptoms such as light-headedness, palpitation, gastrointestinal disturbances and sweats subside. Insomnia is controlled, fears and feelings of inferiority depart and a sense of well-being again develops. Enough hormone should be given during the first ten days of treatment to stop the flushes. The dose can then be reduced but one should continue to administer sufficient hormone to hold the symptoms in abeyance for at least three months to allow the woman a chance to feel like her former self for a time. Then the dose may be reduced gradually and finally the administration may be stopped for a month. (Sudden cessation of administration of a fair sized dose of hormone may induce bleeding or increase the vasomotor disturbances, neither of which is desirable.) If necessary, then, the course of treatment can be repeated. The second course of therapy usually can be lighter than the first. The hot flushes and associated sensations disappear first. Insomnia and simple depression disappear slowly and larger doses of hormone may be necessary if these are present.

The estrogenic hormone may be given either intramuscularly or orally. In my experience estradiol benzoate has been very satisfactory in the treatment of the symptoms of this period. When intramuscular injections are given it is usual to give 10,000 international units every other day for the first week or ten days until the flushes have ceased and the vaginal smear shows the typical estrogenic effect; then every third day is sufficient and the treatment is thus continued for three months. The dose can then be reduced to 5,000 international units

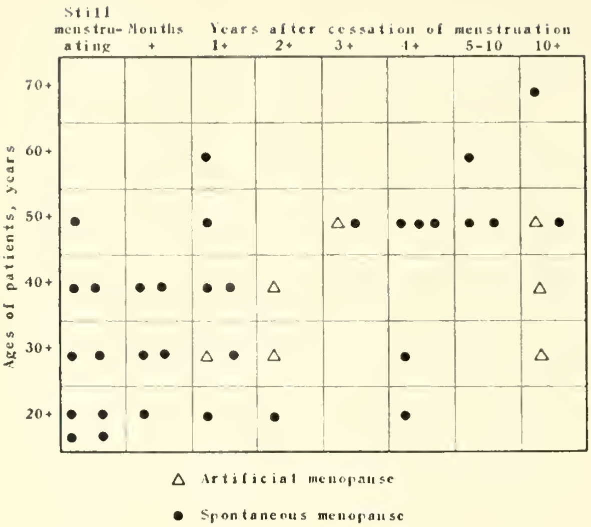

Fig. 1. Patients with typical hot flushes and associated symptoms and excess gonadotropic hormone present in the urine.

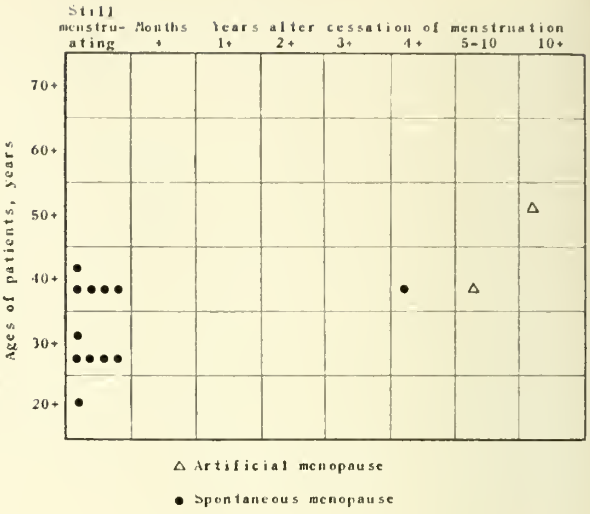

Fig. 2. Patients without hot flushes but who had other symptoms suggestive of ovarian failure and excess gonadotropic hormone present in the urine.

every third day for another month, to half this amount for a month and then stopped for a month. The flushes tend to return about twelve to fourteen days after treatment is discontinued.

The cessation of symptoms is as good an index of the effect of therapy as is the vaginal smear in the average case. When the symptoms are not controlled with the usual doses it is well to examine vaginal smears to see if the patient has reacted as she should to the hormone. It is also well to have a urine determination made for an excess of gonadotropic hormone. In cases in which women have bizarre symptoms during the menopausal age and in cases in which hot flushes are complained of long after the age when these usually cease, it is well to determine the amount of gonadotropic hormone before beginning treatment. Novak has stated that women are wont to ascribe any subjective symptoms which occur after the age of forty to the oncoming menopause and physicians may innocently foster such ideas by too readily acquiescing in such explanations. When such a patient is told that it is possible to tell by a urinary test whether or not the ovaries are beginning to fail she usually will coöperate in saving the urine. If three determinations reveal no excess of gonadotropic hormone, one is justified in telling her that another explanation must be found for her symptoms.

At the present time oral medication has practically supplanted intramuscular medication. There are comparatively few women who cannot take the synthetic estrogenic hormone stilbestrol and get relief. Nausea or vomiting seldom results if the daily dose is kept at 0.5 mg.; this is enough to stop the flushes in ten to twelve days when the dose often can be reduced to 0.25 mg. In the spontaneous menopause, bleeding will often occur if doses of 0.5 mg. are continued more than six weeks; therefore, it is well to reduce the dose as soon as possible. Bleeding is not so prone to occur with smaller doses. After a radium menopause, administration of larger doses of stilbestrol seldom causes bleeding, as has recently been well substantiated by Grauer and Nugent, and after such a menopause women seem to need larger doses of the hormone to control their symptoms. The bleeding occurs often before any rest period has supervened; therefore, it is not deprivation bleeding. The larger the dose of stilbestrol, the sooner the bleeding may occur. If the administration of stilbestrol is stopped suddenly, the bleeding may become worse after four or five days; this probably is true deprivation bleeding. It is best to decrease the dose of stilbestrol and inject 2 to 5 mg. of progesterone daily for five days. If this is done, the bleeding usually will cease three or four days later. If it does not, a diagnostic curettage should be done. Then the dose of stilbestrol can be decreased still further and continued at this lower level, such as 0.1 mg. daily. This may not give the same sense of well-being or control all of the flushes but the woman will get along with this dose rather than have the bleeding recur.

The natural estrogens are not so likely to provoke bleeding, especially when their administration is begun one or two years after the cessation of the menses and if a rest period is instituted every few months. If given in fair sized doses before the menses have ceased entirely, they may at first prolong the interval between the menses and then induce more frequent and more profuse periods. Mazer has given 10 mg. of testosterone propionate with each intramuscular dose of estrogen for one month when the bleeding ceases.

In cases in which women are still having rather regular cycles with vasomotor disturbances and increased molimina, the hormone can be given from the twelfth to the twenty-fourth day of the cycle without disturbing the regularity of the cycle unless the doses are too large. If the period is postponed the dose can be de-

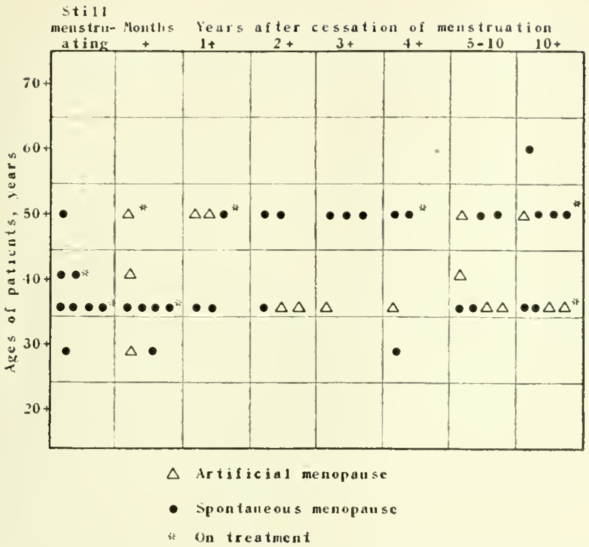

Fig. 3. Patients with hot flushes and associated symptoms, for the most part mild or better with treatment, and without excess gonadotropic hormone in the urine.

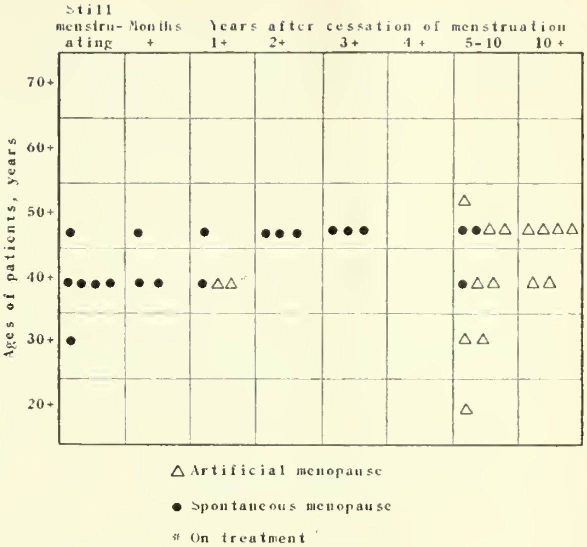

Fig. 4. Patients without hot flushes, but who had some bizarre complaint attributed to the menopause, and whose urine did not contain excess gonadotropic hormone.

creased. It is well to let the ovaries function as long as they will.

As this hormonal bleeding with stilbestrol may occur two or three years or longer after the cessation of the menses, the patient may become very much upset unless she has been warned that it may occur.

Sensitization to stilbestrol has been reported. Severe angioneurotic edema has occurred. Skin rashes should warn against its further use. Exfoliative dermatitis has been reported. Some women complain of increased nervousness with its use and prefer the natural hormones. A potent natural hormone, for oral administration, known as premarin, recently placed on the market, is preferred by some women. It has been my experience that the oral preparations are more easily tolerated and not so easily forgotten when taken at bedtime. The effect of the injections of estradiol benzoate may last for ten to twelve days after therapy is stopped. With oral medication the effect lasts only about forty-eight hours; therefore, when the preparation is given orally it should be taken daily.

During the first week or two of the estrogen therapy a barbiturate to induce sleep will give the woman who is exhausted from the flushes considerable comfort and the hormone seems to become effective sooner. The sensible woman will dispense with the barbiturate when she begins to feel better.

In case of a malignant lesion of the genitalia or breasts or in which there is a family history of such a lesion, it is better to use androgen rather than estrogen during this period. If the total dose is kept down to 300 mg. a month, masculinizing effects are not likely to occur and the flushes may be controlled. Often, with persuasion, these patients can be tided over with rest and sedatives.

In the treatment of the atrophic disturbances of the third period, estrogenic hormone is again helpful. When one is dealing with a simple atrophic vulvitis and vaginitis accompanied by a sense of fullness and soreness in the vagina and itching of the vulva, the local use of the hormone alone in the form of suppositories, or its oral administration, is sufficient. If a secondary infection in the vagina or Trichomonas have produced severe vaginitis with considerable discharge, specific treatment helps to clear up the local condition and the hormone is given orally to aid in effecting a temporary cure. In treating senile vaginitis one must use more caution than is necessary in menstruating women. Milder medication is necessary. Especially is this true until the mucous membrane is built up with the estrogen.

In these cases it is usual to give the hormone only for five or six weeks. The therapeutic effect of the hormone can be attained in ten to twelve days. If it is held then for four or five weeks, the patient has recovered and may go on without any symptoms. It is better to warn her that the trouble may recur.

Leukoplakia of the vulva is treated surgically with vulvectomy. Hormone given after this may prevent a recurrence of the itching and the leukoplakia which seems to result from long continued itching and the trauma incident to friction. In the presence of any suspicious nodule, ulceration or fissure about the vulva, biopsy should be performed before a course of hormonal therapy is given.

Summary

It can be said that as knowledge of gynecologic endocrinology has advanced many of the symptomatic manifestations of the climacterium have been put on a sound physiologic basis. Much further investigation is needed. As yet, little is known as to how the vasomotor wave is initiated or through what nervous pathways the impulse travels. That the gonadotropic hormone of the anterior lobe of the pituitary body is present in the blood and urine in increased amounts during the period when the vasomotor disturbances begin and are at their height seems to be established. Whether the hot flushes are directly due to the increase in secretion of the hormone of the anterior lobe of the pituitary body is still a muted question. However, if the amount of hormone is found to be in excess and the woman is complaining of vasomotor disturbances or of the symptoms often associated with this condition, she is entitled to a course of hormonal therapy. Estrogens have proved their value not only in the treatment of the subjective symptoms of the second period of the climacterium but also in the treatment of the atrophic manifestations of the third period.

Data derived from study of cases are summarized in Figures 1 to 4 inclusive.

REFERENCES

1. Drips, Della G.: Treatment of functional menstrual irregularities, M Clin. North America 21:909-928 (May) 1937.

2. Drips, Della G., and Osterberg, Arnold E.: An evaluation of the Frank method for the determination of prolan (gonadotropic principle) in the urine of non-pregnant women, Endocrinology 23:703-710 (Dec.) 1938.

3. Grauer, R. C., and Nugent, Ellen: Studies in diethylstilbestrol. II Differences in response of radium induced and physiological menopause. III. Effect on liver. Surg., Gynec. & Obst. 74:686-691 (Mar.) 1942.

4. Hamblen, E. C.: Endocrine gynecology, Springfield, Ill., Charles C. Thomas, 1939, p. 187.

5. Heller, C. G., and Heller, Emily J.: Gonadotropic hormone: urine assays of normally cycling, menopausal, castrated, and estrin treated human females, J. Clin. Investigation 18:171-178 (Mar.) 1939.

6. Mazer, Charles, and Mazer, Milton: Use of testosterone propionate in the treatment of premenopausal dysfunction uterine bleeding, Pennsylvania M. J. 43:1713-1716 (Sept.) 1940.

7. Novak, Emil: The management of the menopause, Am. J. Obst. & Gynec. 40:589-595 (Oct.) 1940.

8. Shorr, Ephraim: The menopause, Bull. New York Acad. Med. 16:453-474 (July) 1940.

9. Zondek, Bernhard: Hormone des Ovariums und des Hypophysenvorderlappens, Ed. 2, Julius Springer, Vienna, 1935, 638 pp.

The Relation of the Hormones to Lactation[*]

W. E. Petersen, Ph.D.

St. Paul, Minnesota

IN general the subject of lactation may be divided into three more or less distinct phases.[1] First is the growth and development of the mammary gland; second is the initiation and maintenance of lactation and third is the ejection or let down of the milk from the finer structures of the gland. While other than endocrine factors are involved hormones play important and indispensable roles in each of these three phases.

MAMMARY GLAND DEVELOPMENT

While the literature on the endocrine relation to mammary gland development is extensive and varied, much remains to be learned before the subject is fully understood. That ovarian hormones are needed has been known for some time, although there is apparent species difference as to whether both estrogen and progesterone are required or just estrogen alone. In the ovariectomized rat and rabbit complete duct growth but only slight alveolar development is observed from estrogen administration. In these species progesterone is required for complete development. In the guinea pig,[2] the goat,[3] the monkey,[4] and the cow[5] estrogen alone apparently not only causes mammary duct growth but also alveolar development. As Beall and Reichstein[6] have isolated progesterone from the adrenals, the alveolar development observed from estrogen administration in these species may be due to progesterone from this source.

The fact that the ovarian hormones are essential does not mean that they are the only ones involved in complete mammary development. Ablation of the pituitary gland has long been known to prevent mammary development after administration of the ovarian hormones. Corner[7] was the first to suggest that the pituitary produced mammogenic hormones as the result of the action of ovarian hormone upon it. Lewis and Turner,[8] Lewis[9] and Mixner[10] have presented evidence to show that estrogen and progesterone do not act directly upon the mammary gland but upon the pituitary to form the mammogenic hormones. According to their findings estrogen causes the pituitary to form Mammogen I[9] which stimulates duct growth, and progesterone stimulates the pituitary to form Mammogen II[10] which causes alveolar development.

The formation of pituitary mammogenic hormones as the result of ovarian hormone action is questioned by the results of other investigations. Greep and Stavely[11] were unable to obtain mammary development from pituitary extracts, presumably containing the so-called mammogenic hormones. Reece and Leonard[12] observed no difference in mammary development when pituitary glands from estrogen and non estrogen treated rats were implanted into host rats. The most damaging evidence against the pituitary mammogenic hormones comes from the observed local effects of topical application to the mammary gland area. Among many reported experiments, topical application of an estrogen to one gland has been observed to cause development of the treated gland without effect on the untreated ones in women by MacBryde;[13] the rat by Lyon and Sako;[14] the monkey by Speert;[15] the guinea pig by Nelson;[16] the goat by

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[*] Dairy Division, University Farm.

Scientific Journal Series paper No. 2043, Minnesota Agricultural Experiment Station.

Folley et al[17] and in the cow by the author. If the mammogenic hormones were formed by the pituitary from the absorbed estrogen the mammary gland growth should be uniform.

Astwood et al[18] suggested that the failure of mammary development to follow ovarian hormone administration in hypophysectomized animals might be due to the state of inanition of the operated animals. Samuels et al,[19] however, observed no better development in estrogen treated hypophysectomized rats which gained weight when force fed by stomach tube than in similar rats on ad libitum feeding. It therefore appears that the ovarian hormones act synergistically with other pituitary or pituitary-controlled hormones to cause development of the mammary glands.

That the growth hormone is needed in conjunction with the ovarian hormones is indicated by the reports of Nathanson et al,[20] Greep and Stavely,[11] and others. Petersen et al[21] observed increased development when growth hormone was administered simultaneously with estrogen to hypophysectomized rats, but such development was not nearly so great as in normal rats.

In hypophysectomy both the thyroid and adrenal glands atrophy indicating that secretions from these two structures may be essential for complete mammary growth. Administration by Samuels et al[22] of adrenotropic, thyrotropic and growth hormones together with estrogen caused increased but still incomplete development in ovarectomized hypophysectomized rats. Spielman and Petersen[23] observed delayed and incomplete mammary development in thyroidectomized cows. The mammary development which did occur is explained as being due to the thyroxin secretion of the fetus which probably begins in mid pregnancy. Petersen et al[24] were unable to note any mammary development in the thyroprive bovine after prolonged administration of stilbestrol as contrasted to rapid development in normal animals.

In summary it can be concluded that complete mammary gland development is dependent upon ovarian hormones, particularly estrogen in some species, but that other endocrine secretions are also necessary. Of the hormones other than ovarian, there is evidence for the need of the growth hormone, thyroid hormone and possibly some adrenal hormone. Other hormones are probably also essential.

Initiation and Maintenance of Lactation

It has been known for some time that the mammary gland could be completely developed either by artificial administration of the ovarian hormones or in pseudopregnant rabbits without lactation ensuing. Stricker and Grueter[25] were the first to show that a pituitary hormone is essential for the initiation of lactation, as they obtained lactation in the pseudo-pregnant rabbit following the injection of an aqueous extract of the anterior pituitary. Since then a large literature has accumulated upon the subject and a lactogenic hormone (prolactin) from the anterior pituitary has been isolated.

That prolactin is essential for the initiation and maintenance of lactation is well established but other hormones are also essential and certain hormones have an inhibitory effect upon lactation. In addition to causing initiation of lactation in artificially developed mammary glands, prolactin has been used in attempts to increase lactation following parturition in cows, goats and women.

The pure prolactin preparations have failed to initiate lactation in hypophysectomized guinea pigs in experiments by Nelson and Gaunt[26] and Gomez and Turner.[27] Since a number of workers obtained lactation under similar circumstances with more crude pituitary extracts this indicates that other pituitary hormones than prolactin are essential. Folley and Young[28] also observed that an aqueous extract of the anterior pituitary was more effective in increasing milk production in cows than preparations of pure prolactin.

On the basis of reported observations it appears that insufficient production of anterior pituitary lactogenic hormones is often the cause of a rapid decline in lactation. Daily subcutaneous administration of anterior pituitary extracts in the declining phase of lactation in the cow has been reported by Evans[29] to increase milk production as much as 50 per cent. A number of other reports on cows show varying but similar response to anterior pituitary extracts. In goats and sheep, milk production has also been shown to be stimulated during the declining phase following the subcutaneous administration of anterior pituitary extracts.

Prolactin has been used with conflicting results in attempts to increase milk secretion during early lactation in women. Kenny and King[30] treated 43 women with insufficient milk to satisfy the needs of the infants and report satisfactory response in 74 per cent of the cases. Kurzrok et al[31] also report favorable results from prolactin. Stewart and Pratt,[32] however, report negative results with 14 women receiving treatment and Werner[33] reports severe reactions from prolactin injections.

The relation of the thyroid hormone to lactation has been studied both by thyroidectomy of lactating animals and by the administration of the thyroid substance to intact lactating animals. Spielman and Petersen[23] observed a rapid decline in milk production in thyroprive cows. Milk production was only about 30 per cent of normal, ceasing in 180 days when in normal animals good milk flow should be maintained for 360 days. Graham[34] obtained only a slight decrease in milk production in cows following thyroidectomy. The reports on the effect of thyroidectomy on lactation in the goat and the rat are also conflicting, some reporting marked diminution in lactation while others observed only slight effects following the operation. It is interesting in this connection that Folley and Young[35] observed that anterior pituitary extracts containing the thyrotropic factor were more effective in stimulating lactation than fractions in which the factor was absent.

Administration of thyroxine and thyroid to intact animals has almost universally been observed to affect lactation. In general in most cases thyroxine or thyroid administration to goats and cows has resulted in both increased milk and fat production with a greater increase in fat to produce a richer milk. Oral administration of di-iodotyrosin has been reported as increasing milk flow in women by Kustner.[36] Turner[37] has reported that oral administration of iodin treated skim milk behaved similarly to thyroxine—the active principle being termed thyrolactin.

That the adrenal hormones play an important part in lactation is becoming increasingly apparent. Ablation of the adrenals has been reported by a number of workers to prevent normal lactation. It is suggested that the adrenal hormones do not exert a direct effect upon lactation but only in so far as they effect general metabolism. The recent report of Gaunt et al[38] adds support to this supposition. They indicate that all adrenal substances that are known to relieve adrenal insufficiency were somewhat helpful in supporting lactation in adrenalectomized rats. Normal lactation was maintained only when compound E and the whole extract of the adrenal cortex were supplied.

The estrogens have been shown in many experiments to have an inhibitory effect upon lactation in the mouse, the rat, the guinea pig, the cow and woman. The increased estrogen secretion during pregnancy has been suggested as the cause of the decline in lactation observed beginning with the fifth month of gestation. This is questionable, however, as much larger amounts of estrogen are required for inhibitory effects than are secreted during pregnancy. Spielman et al[39] and Folley et al[40] report that daily subcutaneous administration of 20 mg. diethylstilbestrol had no inhibitory effect upon lactation in the cow but increased the concentration of lactose, milk fat and protein. Folley,[41] however, found large doses of estradiol to have an inhibitory effect upon lactation in the cow.

In woman, estrogens have been used extensively in the treatment of painful, engorged breasts in puerperium. Kurzrock et al[42] recently reported that daily oral administration of 1.5 to 2.4 mgm. of ethinyl estradiol over a period of two to four days from four to twenty-one days postpartum inhibited lactation even though the infants had begun to nurse. Diddle et al[43] found that diethylstilbestrol was as effective as alpha estradiol in the treatment of engorged postpartum breasts when given orally.

Testosterone has also been shown to inhibit lactation. Recently Jeppson et al[44] compared testosterone propionate with diethylstilbestrol. They report that while testosterone propionate was useful in preventing or discontinuing lactation it was of no value in relieving painful engorged breasts in puerperium.

Before passing on to a consideration of the ejection of milk from the mammary gland a brief report of some work by the author and coworkers is in order. In a series of experiments in which diethylstilbestrol was administered to a normal male, a castrate male, and to female bovines of all ages, results have been obtained that are not wholly explained by the heretofore accepted principles of endocrine relationship to lactation. In the male and castrate male diethylstilbestrol caused teat elongation, slight development of the gland and a few ml. of normal milk obtained daily on milking. Variation in the amounts given and the interim between doses failed to produce any substantial development.

The response to diethylstilbestrol by female calves up to a few months of age was similar to that of the male. With increased age the amount of gland development increased until, in sterile heifers of breeding age, the gland development approximated that expected following a normal gestation. The most significant observation is that in these animals diethylstilbestrol not only caused development of the mammary gland but initiated lactation that approximated the level expected following a normal gestation. Lactation in one of these animals has continued at a satisfactory level for nearly seven months following the initial diethylstilbestrol treatment covering a period of two weeks.

EJECTION OR "LET DOWN" OF MILK

There have been many postulates advanced to account for the turgidity observed in the functional mammary gland as a normal response to the milking or nursing act. One of the oldest of such postulates was that as the result of the nursing act the gland was stimulated into increased secretory activity. The work of Petersen et al,[45] Swett et al[46] and others showed that all of the milk obtained at a milking was present in the gland at the time milking begins and that little or no milk is secreted during the milking act. Hammond[47] among others postulated that milk was let down as the result of the milk stimulus causing the udder and teats reflexly to become engorged with blood which in turn forced the milk out of the alveoli and finer structures into the larger collecting ducts and cisterns. Others have thought the milk to be forced out by muscular contraction stimulated reflexly by the milking or nursing act.

Hammond[48] was the first of a number of workers to show that an intravenous injection of a posterior pituitary extract caused a let down of milk in the cow. Ely and Petersen[49] first concluded that the posterior pituitary is involved in the normal let down of milk. After a series of experiments involving section of the nerve trunks to the bovine udder and the injection of the oxytocic principle of the posterior pituitary, they postulated the phenomenon of the let down of milk was due to the action of oxytocin upon the gland. The let down of milk is therefore a reflex process in which the milking or nursing act stimulates the sensory nerve endings which, through the afferent pathways, stimulates the posterior pituitary to secrete the oxytocic principle. Petersen and Ludwick[50] proved the factor responsible for the let down of milk to be humoral in nature. They found that blood drawn from a cow stimulated to let down her milk caused let down of milk in excised glands when perfused with such blood while blood from cows not stimulated to let down the milk had no effect.

Ely and Petersen found that cows do not respond with a let down of milk when frightened or angered. They concluded that the response to the milking act is interfered with by states of strong emotion. Intravenous injection of epinephrin also completely inhibited response to the milking act. Miller and Petersen[51] noted that once the cow had become stimulated to let down her milk, the hormone was effective for but a short time. When cows were stimulated to let down their milk 20 minutes before milking began, such milkings were incomplete and, when repeated over a period of time, a marked decline in lactation was observed. As the oxytocic hormone is rapidly destroyed in the blood these observations fit in with expectations.

Not only does epinephrin interfere with a normal response to the milking or nursing act but evidence now at hand indicates that it will decrease milk secretion by its unusual vasoconstrictor effects in the mammary gland. Petersen[52] has shown that small amounts of epinephrin may cause a complete stoppage of blood flow through the perfused bovine mammary gland. Even more striking is the observation of Petersen and Ludwick[50] in which blood drawn from an excited cow caused a decrease in blood flow through the perfused gland to about 10 per cent that of normal blood. These facts explain in part at least, the poor results observed by dairymen when milking cows are roughly handled or excited.

While observations must be extended to nursing mothers before definite conclusions can be drawn from the facts now known, some of the lactation failures can be explained and corrected. It is possible if not probable that some mothers do not respond properly to the nursing act. The breast is therefore not evacuated and yet the infant does not receive enough milk. Incomplete evacuation of the gland, periodically, causes a back pressure in the alveoli from the accumulating milk which hastens involution. A state of worry, fear or any other strong emotion, probably also interferes with normal milk secretion in women as it does in the cow.

BIBLIOGRAPHY

1. Petersen, W. E.: New developments in the physiology and biochemistry of lactation, J. Dairy Science 25:71, 1942.

2. Nelson, W. O.: Endocrine control of the mammary gland, Physiol. Rev. 16:488, 1936.

3. de Fremery, P.: Experiment on hormonal regulation of lactation in goats, Arch. Nedrl. de Zool. 3:48, 1938.

4. Gardner, W. U., and van Wagenen, G.: Experimental development of the mammary gland of the monkey, Endocrinology 22:164, 1938.

5. Petersen, W. E., and Ludwick, T. M.: Unpublished data.

6. Beall, D., and Reichstein, T.: Isolation of progesterone and allopregnanolone from the adrenal, Nature, Lon., 142:479, 1938.

7. Corner, G. W.: The hormonal control of lactation. I. Non-effect of corpus luteum. II. Positive action of extracts of the hypophysis, Am. J. Physiol. 95:43, 1930.

8. Lewis, A. A., and Turner, C. W.: The mammogenic hormones of the anterior pituitary. I. The duct growth factor, Mo. Agr. Exp. Sta., Research Bul. 310, 1939.

9. Lewis, A. A.: The hormone control of mammary duct growth, J. Dairy Science 23:540, 1940.

10. Mixner, J. P.: The mammogenic lobule-alveolar factor of the anterior pituitary, J. Dairy Science 23:542, 1940.

11. Greep, R. O., and Stavely, H. E.: "Mammogen" and the treatment of spayed hypophysectomized rats with lipoid extracts of cattle pituitary, Endocrinology 29:18, 1941.

12. Reece, R. P., and Leonard, S. L.: Further evidence for a mammogenic factor in the rat hypophysis, Proc. Soc. Exper. Biol & Med. 42:200, 1939.

13. MacBryde, C. M.: Production of breast growth in the human female by the local application of estrogenic ointment, J.A.M.A. 112:1045, 1939.

14. Lyon, W. R., and Sako, Y.: Direct action of estrone on the mammary gland, Proc. Soc. Exper. Biol. & Med. 44:398, 1940.

15. Speert, H.: Mode of action of estrogens on the mammary gland, Science 92:461, 1940.

16. Nelson, W. O.: Growth of the mammary gland following local application of estrogenic hormone, Proc. Am. Physiol. Soc. 53rd annual meeting, 209, 1941.

17. Folley, S. J., Scott Watson, H. M., and Bottomley, A. C.: Induction of lactation in goats with diethylstilbestrol propionate, J. Physiol. 98:15, 1940.

18. Astwood, E. B., Geschicter, C. F., and Rausch, E. O.: Development of the mammary gland of the rat. A study of normal, experimental and pathologic changes and their endocrine relationships, Anat. Rec. 61:373, 1937.

19. Samuels, L. T., Reinecke, R. M., and Petersen, W. E.: Relation of nutrition to mammary growth after estradiol administration to hypophysectomized rats, Proc. Soc. Exper. Biol. & Med. 46:379, 1941.

20. Nathanson, I. I., Shaw, D. T., and Franseen, C. C.: Effect of simultaneous administration of growth complex and estradiol on mammary gland of hypophysectomized rat, Proc. Soc. Exper. Biol. & Med. 42:652, 1939.

21. Petersen, W. E., Samuels, L. T., Reinecke, R. M., and Bauman, K.: Unpublished data.

22. Samuels, L. T., Reinecke, R. M., Petersen, W. E., and Bauman, K.: Unpublished data.

23. Spielman, A., and Petersen, W. E.: The effect of thyroidectomy on mammary development and lactation in the cow. In preparation for publication.

24. Petersen, W. E., Ludwick, T. M., and Boyd, W. L.: The effect of stilbestrol upon mammary development and lactation in the cow. In preparation for publication.

25. Stricker, P., and Grueter, F.: Action du lobe anterieur de l'hypophyse sur la montee larteuse, C. R. Soc. Biol., Paris, 99:1978, 1928.

26. Nelson, W. D., and Gaunt, R.: Initiation of lactation in the hypophysectomized guinea pig, Proc. Soc. Exper. Biol. & Med. 34:671, 1936.

27. Gomez, E. T., and Turner, C. W.: Initiation and maintenance of lactation in hypophysectomized guinea pigs, Proc. Soc. Exper. Biol. & Med. 34:404, 1936.

28. Folley, S. J., and Young, E. G.: Prolactin as a specific lactogenic hormone, Lancet, March 1941, p. 380.

29. Evans, E. I.: The effect of prolactin upon the milk yield of lactating cows and goats, Am. J. Physiol. 116:45, 1936.

30. Kenny, M., and King, E. J.: Effect of prolactin on lactation in nursing women, Lancet 237:828, 1939.

31. Kurzrok, R., Bates, R. W., Riddle, O., and Miller, E. G.: The clinical use of prolactin, Endocrinology 18:18, 1934.

32. Stewart, A. L., and Pratt, J. P.: Effect of prolactin on mammary gland secretion, Endocrinology 25:347, 1939.

33. Werner, A. A.: Lactogenic hormone. Severe reactions from its use, Endocrinology 24:119, 1939.

34. Graham, W. R. Jr.: Effect of thyroidectomy and thyroid feeding on the milk secretion and milk-fat production of cows, J. Nutr. 7:407, 1934.

35. Folley, S. J., and Young, F. G.: Effect of continued treatment of anterior pituitary extracts on milk volume and milk-fat production in the lactating cow, Biochem. J. 33:192, 1939.

36. Kustner, H.: Steigerung der Milchsekretion durch antilhyreoiden Schutzloff, Munch. Med. Wschr. 81:1261, 1934.

37. Turner, C. W.: Thyrolactin, a new source of thyroxine for dairy cattle, J. Dairy Science 23:535, 1940.

38. Gaunt, R., Eversole, W. J., and Kendall, E. C.: Influence of some steroid hormones on lactation in the adrenalectomized rat, Endocrinology 31:84, 1942.

39. Spielman, A., Ludwick, T. M., and Petersen, W. E.: The effect of diethylstilbestrol on milk secretion, J. Dairy Science 24:499, 1941.

40. Folley, S. J., Watson, H. M. S., and Bottomley, A. C.: Experiments on the chemical enrichment of cows' milk by the administration of diethylstilbestrol and its dipropionate, J. Dairy Research 12:1, 1941.

41. Folley, S. J.: Effects of estrogens on lactation, Lancet, January 1941, p. 40.

42. Kurzrok, L., Birnberg, C. H., and Livingston, S.: Use of ethrinyl estradiol to prevent lactation puerperal patients, J. Clin. Endocrinology 2:471, 1942.

43. Diddle, A. W., Nagyby, S. F., and Sello, R. L.: Comparative clinical effects of orally administered alpha-estradiol and diethylstilbestrol on postpartum engorgement of the breast, J. Clin. Endocrinology 2:307, 1942.

44. Jeppson, E. M., Kasabach, H. Y., and Kanten, E. A.: Effect of testosterone propionate and stilbestrol on the mammary gland postpartum, J. Clin. Endocrinology 2:16, 1942.

45. Petersen, W. E., Palmer, L. S., and Eckles, C. H.: Synthesis and secretion of milk fat. I. Time of milk and fat secretion, Am. J. Physiol. 90:573, 1929.

46. Swett, W. W., Miller, F. W., and Graves, R. R.: Quantity of milk obtained from amputated cow udders, Jour. Agr. Res. 45:401, 1932.

47. Hammond, J.: The physiology of milk and butterfat secretion, Vet. Rec. 16:519, 1936.

48. Hammond, J.: The effect of pituitary extract on the secretion of milk, Quart. J. Exper. Physiol. 6:4:311-338, 1913.

49. Ely, F., and Petersen, W. E.: Factors involved in the ejection of milk, J. Dairy Science 24:211, 1941.

50. Petersen, W. E., and Ludwick, T. M.: The humoral nature of the factor causing the let down of milk, Federation Proc. 1:66, 1942.

51. Miller, K., and Petersen, W. E.: Some factors involved in efficient milking, J. Dairy Science 24:225, 1941.

52. Petersen, W. E.: The effect of certain hormones and drugs on the perfused mammary gland, Proc. Soc. Exper. Biol. & Med. 50:209, 1942.

Intersexual Manifestations of Nonendocrine Origin

Max H. Hoffman, M.D.
St. Paul, Minnesota

THE clinical endocrinologist is extremely interested in any unusual manifestations of the secondary sex characters as they are often of prime diagnostic importance. Variations in these characters are frequently of such slight degree that they are hardly noticeable, others are so marked that they are the cause of much unhappiness to the patient.

These cases may be grouped into two main divisions, (1) those resulting from endocrine disturbances, and (2) those arising from disturbances or alterations in the germ plasm.

In this discussion we are interested mainly in the second group which is referred to as the constitutional, chromosomal or genetic type. These terms have the same significance and are used interchangeably.

Bauer[1] in a discussion on constitutional medicine writes as follows: "Endocrine disorders cannot be fully understood without regarding constitutional (chromosomal) pathology. Perhaps the best illustration of this is the part displayed by the endocrine glands in the sex differentiation of the individual; the sexual differentiation is determined by the chromosomal structure in the fertilized ovum. Under the influence of the chromosomal sex constitution, the differentiation of the gonads takes place. Intersexuality is in the majority of cases chromosomal due to an abnormally low prevalence of one of the two sexual tendencies."

The biologist has for a long time recognized the relationship existing between the germ plasma and the variations in the sex characters of various forms of animal life. The physician has been slow to accept the part played by constitutional factors in the conditions which he treats. An eminent biologist[2] writes, "Those who are concerned with human sex manifestations would do well to study and think over the results of modern research in the biology of sex, which are not yet generally appreciated or properly evaluated."

Sex is determined by qualities in the fertilized ovum. The direction of the sex differentiation is principally a function of the specialized sex chromosomes present in the nuclear material. After differentiation has taken place, further sex development occurs mainly through the elaboration of sex hormones. Each individual possesses the sex characters of both sexes, one in a rudimentary state, and the other sensitized to respond to the proper sex hormones. The degree of response to hormonal stimulation is laid down at the time of sex determination by the sex determiners (chromosomes).

When we refer to the male or female sex we are considering a composite picture produced by a number of sex characters which vary widely in different individuals of the same sex. That is, a female may have poorly developed feminine characters such as breast fat distribution, hair, etc. Likewise, the male may possess some characters tending toward the feminine side such as slight gynecomastia, female pubic hair distribution, etc. These variations are not endocrine in origin and in most cases should not be considered as abnormal types. All individuals do not necessarily have to fit into the same mold in regard to the sex characters any more than all individuals should have Roman noses or blue eyes.

Some individuals, however, vary so greatly from the usual sex pattern that we feel that some pathological process has taken place either in the chromosomes or the glands of internal secretion. The differential diagnosis is often very difficult and frequently an exploratory operation is necessary to prove the presence or absence of a hyperfunctioning glandular tumor.

The history is often of great importance, particularly the family history showing one or more individuals with a similar condition in the family. The time of onset is important; abnormalities appearing at the menarche are usually genetic while hyperfunctioning tumors may occur at any time of life. Reversal of sex characters is practically always due to abnormal hormone influence.

As yet we have no simple aids to help in the diagnosis. Recently methods of determining the sex hormone excretion in the urine have been developed. These studies have been of great aid in differentiating those cases having hyperfunctioning tumors from the other types. It is felt that in time, with more data and improvements in our methods, these studies will be very helpful clinically.

The X-ray often aids the differential diagnosis, particularily in the cases of adrenal cortical tumors causing sex reversal changes. Following the injection of air around the kidneys and the adrenal glands the X-ray may reveal the enlarged and abnormal gland. These tumors are not always revealed by this technic but when they can be seen the diagnosis is conclusive.

When alteration in sex characters is due to hormone influence, all of the sex characters are apt to be disturbed in some degree. In cases of genetic origin only certain sex organs may be disturbed although the changes may be multiple.

One of the most common types of intersexual manifestations occurring in the male is breast enlargement due to breast tissue being present (gynecomastia). In most of the cases of gynecomastia the breast tissue development is so little that no problem results. At times, however, it is so marked that the individual seeks medical aid. Case 1 is an individual of that type (fig. 1).

This boy is 16 years old. Two years ago he noticed that his breasts were enlarging. This caused him great embarrassment as he was in constant close association with other boys. The enlargement has progressed steadily. His only discomfort is that, following exercise, he has considerable soreness in the breasts. When he plays ball during the day the breasts are painful at night. He is in no sense a "sissy" and at present is confined in a corrective institution because of petty thefts. He admits to having had sex relationships and has frequent erections and nocturnal emissions. His voice, actions and mannerisms are entirely male. He has never shaved.

The physical examination shows a well built individual whose body configurations and muscle development are male: the voice is also male. There is no adult hair on the upper lip or chin. The pubic hair is heavy and of a feminine distribution. The penis, scrotum, testis and prostate are normal for a male of his age. Both breasts are enlarged and have the development and consistency of a normal girl. The pigment in the nipple and areolar area is quite prominent.

The routine laboratory examinations were normal. The basal metabolic rate on two examinations was —2 per cent and +7 per cent. The acid and alkaline phosphatase levels were normal for his age. The sperm count was low, 2,000,000 cells, of which about 25 per cent were non-motile. Many of the sperm heads were small. Studies of the urinary sex hormone excretions showed low levels of both androgens and estrogens.

This boy presents several abnormalities in his secondary sex characters: the lack of beard growth, the feminine type of pubic hair distribution and the enlarged breasts. Of these, only the unusual development of the breasts is important. The lack of facial hair may represent a delayed condition; the pubic hair pattern is encountered frequently in males who have no other abnormality of the secondary sex characters. The breast enlargment is striking and of great psychological and social importance to this individual.

Although the male hormone (androgen) excretion as judged by the urinary hormone studies is low, it is evidently sufficient to stimulate the normal male secondary sex characters to develop; otherwise, the accessory genitalia would not be normal. The female hormone (estrogen) production was not excessive so we can feel the breast tissue has not received any unusual hormone stimulation.

The explanation of the disturbed mechanism in the sex character development of this boy must be on a chromosomal basis. At the time of sex determination something went wrong and the differentiation was not complete. The breasts received the quality of responding to the female hormone just as in the normal female, while most of the other sex characters are male. Bauer has pointed out that along with various types of constitutional changes there are frequently also endocrine gland disturbances. The glandular condition must be considered as a concomitant manifestation and not the cause of the secondary sex character changes.

Excessive amounts of female hormone in a male can produce gynecomastia. This is well shown by tumors producing larger amounts of estrogen such as have been reported in feminizing tumors of the adrenal gland, and in choric epithelioma. Recently the use of stilbestrol in males has been reported to produce gynecomastia. In our case, however, there is no evidence that excessive estrogenic stimulation is involved.

Hirsutism in a female is, in most instances, a constitutional abnormality. It is a very common finding that almost always it is a source of distress to the female who has it. When it is on the face or neck the individual seeks medical help. Usually it appears shortly after puberty and continues to develop for a few years and then remains stationary. If the growth continues to increase after 20 to 22 years of age, one can suspect a glandular disturbance.

Hair growth in excessive amounts occurring on the legs and forearms is very common. If in addition, a heavy dark growth appears on the face, neck or breast, the patient attempts to get rid of it by various methods. Most of these patients are willing to go to any extremes to rid themselves of their disfigurement.

Case 2 is a marked example of hirsutism of non-endocrine origin. This patient, a female, age 48, was told a year before she was seen at the hospital that she had high blood pressure. She entered the hospital because of a disturbed mental state, headaches, and weakness in the right arm and leg. A heavy beard growth was a striking feature in this patient. Because of her mental condition it was impossible to get an accurate history from the patient. A sister with whom she lived said that her sister had a beard as long as she could remember. She also stated that the patient was obese since childhood. We were unable to get a menstrual history.

The physical examination showed an obese female, very active physically, but mentally retarded. The

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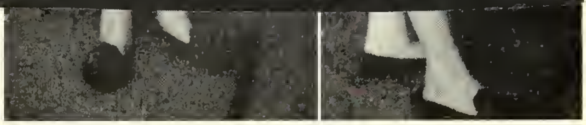

Fig. 2. Constitutional Hirsutism.

obesity was confined to the head, neck and trunk. The extremities were normal. The beard and mustache was very heavy and dark. There was also a rather heavy growth of hair on the extremities and abdomen of the masculine type. The voice was feminine. No striae were present on the chest or abdomen. Breast development was normal. The heart was enlarged to the left. Blood pressure, 250/150. The pelvic organs and external genitalia were normal.

Several eye examinations were made but were unsatisfactory because of poor coöperation on the part of the patient. The right pupil at one time was larger than the left, at another time both were the same. The retinal discs were choked and there was diffuse exudation in both eye grounds. The oculist felt that the visual field examinations showed a homonymous hemianopsia but he was not certain.

The laboratory examinations were as follows: The urine showed albumen in varying amounts in all examinations. The blood was negative except for a leucocytosis. Blood Wassermann was negative, serum calcium 9.5 mg./per cent, glucose tolerance: fasting 80 mg./per cent, 1 hour 210 mg./per cent, 2 hours 205 mg./per cent, 3 hours 130 mg./per cent. Spinal fluid was negative. Urinary sex hormone excretion determination showed androgens, 3.2 Int. units per day, estrogens, 220 Int. units per day. X-ray Studies: Skull negative. Encephalogram after injecting 30 cc. of air showed ventricles shifted to the left with an impression present on the lateral wall of the left ventricle. This suggested a mass above the lateral to the sella turcica. Perirenal air injections showed that both adrenal glands were apparently normal in size and shape.

An exploratory operation revealed a subdural hematoma containing 30 cc. of fluid. It was located at the junction of the left parietal and frontal lobes. Following the operation she developed a high temperature and died in a few days.

The postmortem examination showed the following important findings. The right adrenal gland contained a greyish white tuberculous mass located in the medulla. The cortex was normal on macroscopic and microscopic examination. The pituitary, thyroid and ovarian glands were normal. No tumor masses were found in the pelvis or abdomen. The heart showed left ventricular enlargement and coronary sclerosis. The kidneys showed arteriosclerosis. In addition to the evidence of hematoma, the brain showed areas of softening in the region of the basalar nuclei.

This patient presented a difficult diagnostic problem. Several possible etiological factors presented themselves. Cushing's disease was at once suggested. The characteristic obesity, hirsutism and hypertension together with the diminished sugar tolerance were in favor of such a diagnosis. Such a possibility was further enhanced by evidence of an intracranial lesion.

Adrenal cortical hyperplasia or a hyperfunctional adrenal cortical adenoma was considered. Against this possibility was the low male hormone excretion in the urine and the normal X-ray findings following the injection of air around the kidneys.

The statement of the sister that the patient had had a beard as long as she could remember was most significant, and pointed toward the constitutional nature of the unusual hair growth. All the patient's clinical findings as shown by the postmortem examination were due to the arterial changes associated with the hypertension.

Alterations in the physical habitus of an individual, particularly those related to the secondary sex characters, are of great importance in endocrine diagnosis. We must recognize, however, that relatively few of these disturbances can be directly attributed to primary hormonal disturbances, and that most of them are of constitutional or germ plasm origin.

The constitutional nature of the disturbance may be at once apparent when several members of the same family have a similar condition. Just recently a 20 year old female presented herself because of marked hair growth in various regions of her body. Her mother and older sister had a similar type of unusual hair distribution. Many of the most marked types of sex character alteration are difficult to distinguish from those resulting from glandular disturbances. Such an example is the bearded woman just cited. In these cases, hormone excretion studies and perirenal air injections are of great value.

An appreciation of the constitutional nature of these cases may prevent useless and expensive examinations and therapeutic attempts. Endocrine therapy in this group is rarely successful. Estrogens at times seem to inhibit the unusual hair growth in hirsutism, and androgens may inhibit the breast development in gyneco-

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An Evaluation of the C
Horn

Charles E.
St. Paul,

THE relation of the testes to the secondary sex characteristics of the male has been known for some time. In fact, the first major advancements in our knowledge of endocrines came from studies pertaining to the testis. That the testes were glands of internal secretion was demonstrated by Berthold in 1849, who showed that the transplantation of gonads into castrated roosters prevented the typical signs of castration. In 1889, Brown-Sequard first claimed to have elicited rejuvenating effects in himself, at the age of 72, by the injection of testicular extracts. His claimed effects were due to autosuggestions rather than to a hormonal therapy, but his experiments are of historical interest as they are the earliest clinical attempts of substitution therapy. In 1911, Pezard reported that he had obtained a stimulation of the growth of the comb of the capon by injecting an extract derived from an relatively small amount of cryptorchid pig testis. Although the potency of his extracts has not been confirmed, his method of testing for the hormone is the basis for most testicular hormone assays at the present time. Most of our early knowledge of the function of the male gonad was obtained from extirpation experiments. Within recent years, however, preparations of testicular hormones have been available and our present knowledge is supplemented by clinical studies on the effects of injections of the active principle of the testicle.

The group of male sex hormones collectively is known as androgens. The androgens of chief clinical interest are testosterone, a substance isolated from testis tissue, and androsterone and dehydroisoandrosterone, which are excreted in human urine. The first of the androgens to be isolated in crystalline form was androsterone, a sterol obtained by Butenandt, who succeeded in isolating 15 mg. of it from 25,000 liters of urine. Testosterone is ten times as active as androsterone in promoting comb growth in the capon. Furthermore, one capon unit of

PHYSIOLOGICAL FUNCTION OF THE MALE SEX HORMONE

As Hamilton has pointed out, for the proper understanding of the uses, limitations and dangers of androgens, it is essential to appreciate (1) the relationship between the testis and the pituitary, (2) the sequelae of castration and of eunuchoidism and, (3) the bodily functions and morphologic changes produced by androgens. Also, in any type of hormonal therapy it is important to consider the following: (1) hormonal preparations act most effectively when they are acting as substitution therapy, (2) an organ of internal secretion cannot be stimulated by its own product of secretion, and (3) giving the product of internal secretion often causes that organ to atrophy as there is really no need for it to work.

The male sex hormone has a variety of functions. It is probable that even in utero the maternal anterior pituitary excites the fetal gonads to secrete androgenic substance and this in turn may be responsible for the prenatal stimulation of some secondary sexual characteristics and for the descent of the testes. Male sex hormone has been identified in the testes of fetal cattle but it disappears shortly after birth. At the time of puberty, as a result of stimulation by the anterior pituitary, the permanent phase of testicular activity is initiated. The secreted androgen is necessary for the development of the sex organs and the secondary sex characteristics of the male. During adult life not only are the androgens necessary for the maintenance of the sex characteristics but also for the integrity of the seminal vesicles, pros-

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*From the department of surgery, University of Minnesota Medical School.

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of androgen to immature male monkeys causes descent of the testicles. If adequate amounts of androgen are injected into pregnant animals, at certain critical stages, the female young exhibit intersexuality. This is commonly seen in the so-called freemartin twin in cattle and sheep, and is thought to be due to the effect on the female of the secretory activity of the testes of the male in utero. Androgens also antagonize most of the actions of estrogens. In women the administration of testosterone can suppress menstruation and cause hypoplasia or atrophy of the endometrium. There is a similarity between the hormones of adrenal cortex and androgens. It is well known that hypersecretion of the adrenal cortex can cause virilism and sexual precociousness. Similar to the adrenal hormone, the administration of testosterone causes a retention of extracellular electrolytes and fluid, as well as a diminution in the excretion of nitrogen, inorganic phosphorus and potassium.

Preparations

Synthetic testosterone propionate is available for therapeutic use as "Oreton" (Schering), "Perandren" (Ciba) and "Neo-hombreol" (Roche-Organon). It is dispensed for parenteral administration in an oily solution containing 5 to 25 mgs. per cc. It may be given subcutaneously in the form of compressed pellets; this is not only more economical and requires replacement at longer intervals, but also gives a more even stimulation than with other methods. Testosterone propionate has also been given orally and there is some evidence that it is absorbed from the gastrointestinal tract, but the clinical benefit is slight. Methyl testosterone is an orally active androgen capable of reproducing the effects of testosterone propionate. The percutaneous administration has been suggested, but as yet is in an experimental stage.

Therapeutic Uses

Most encouraging reports in the use of male sex hormones is in the replacement therapy of prepuberal and postpuberal castrates. If androgen is given to the postpuberal castrate, it is possible to restore masculinity and overcome many, if not all, of the signs and symptoms of the syndrome. If androgen is given long after the normal time of maturation to the prepuberal castrate, it is not possible to overcome all manifestations of the deficiency, but definite improvement can be noted. It is important that an adequate dose be given these people, which amounts to about 20 mgs. of testosterone propionate in 1 cc. of oil intramuscularly six or seven times a week. The injection of 20 mgs. three times a week has not been adequate for a good clinical effect and has not been sufficient to maintain urinary androgen at the average levels found in normal men.

Male hormone has been suggested in the treatment of cryptorchidism, but the results have been discouraging. (Hamilton).

Its use has also been recommended for the treatment of prostatic hypertrophy. However, there is little evidence that the administration of androgens can cause involution of an existing hypertrophic gland (Heckel, Creevy and Rea) and there is a possibility that the male sex hormone in itself may cause a still greater enlargement of the gland. There is some indication that nocturia, dribbling and control of the urinary stream may be benefitted by androgen therapy, but this effect may be psychic or secondary to a generalized improvement in muscle tone rather than any specific action on the prostate.

Testosterone propionate has been used in cases of gynecomastia associated with no other body abnormality in the male. Our experience has been limited to six such cases; three of the patients were over 30 years of age and the other three under 30 years. The oldest patient was 54 years of age. Two of the patients had had mumps and one had definitely atrophic testes. Testosterone propionate was given in doses of 25 mgs. three times a week for eight doses. In none was there complete and persistent regression of the gynecomastia. Similar to that of Sullivan and Munslow, our impression is that hormonal therapy of "essential gynecomastia" in the male is inferior to surgical treatment.

In normal man, in fact in all primates, testosterone causes a reduction in the spermatogenic activity. In the rat, spermatogenesis can be maintained by androgens and stimulated or maintained by gonadotropins. There is no endocrine substance available to date which has proved adequate for the stimulation of spermatogenesis in the eunuchoid man. As far as impotence is concerned, male hormone is of more value than in sterility, but it must be remembered that probably the greater number of cases of impotence is on a psychogenic basis. Potency has been observed repeatedly in persons with pronounced organic and functional signs of testicular insufficiency and with low titers of urinary androgenic activity.

Male hormone therapy has been suggested in the treatment of the "male climacteric." Whether there is such a thing as a "male climacteric" is open to question. It is supposed to be a condition analogous to the menopause in women characterized by vasomotor and mental symptoms, melancholia, nervousness, and fatigability. If there is a male climacteric, it must be proved that there is diminished testicular secretion before one would expect improvement upon the administration of testosterone. While there have been reports showing that androgens have been of value in correcting muscle fatigue in myotonia atrophica and genital atrophy there have been no reports where androgens have been of value in correcting muscular weakness not accompanied by decreased testicular secretion. There is no question but that there is an interrelation among sexual and behavioral spheres and body function. Most investigators have been interested in the rejuvenation phase and have not analyzed results of therapy with controlled experiments. The psychic background of many of the so-called sexual disorders of the male should be carefully investigated rather than indiscriminately treating such cases with male hormones. (Hamilton).

The striking effects of testosterone in the female has led to its use in certain gynecologic disorders. Testosterone inhibits the gonadotropic action of the pituitary and hence is used to alleviate menopausal symptoms. It suppresses menstruation and has been used in functional uterine bleeding and in dysmenorrhea. If the dose is large or continued for too long a time, virilism may develop which is slow in regressing and the voice may not return to normal. Testosterone also inhibits lactation but its use in the interruption of lactation, the treatment of painful breasts, etc., needs more clinical evidence before it can be considered safe treatment.

DANGERS IN THE USE OF MALE HORMONE

It has already been mentioned that sexual precociousness can be produced in sexually immature children and also the use of large doses in a child may result in closure of the epiphyses. When large doses are employed in women, masculinization may result. While these changes are largely temporary, there is experimental evidence that there may be permanent modification if the female is subjected to the influence of much androgen at an early age, especially prenatally. As to the use of testosterone in such vaguely defined conditions as the male climacteric and atonicity, the psychic features have to be carefully ruled out before giving opinion as to the results obtainable with male hormone. In such states there is no question but that a state of euphoria is not uncommon in patients receiving testosterone. This sense of well-being probably accounts for most of the "stimulation" of older men treated with androgens. Older patients receiving the hormonal therapy should be warned against trying to lead the life of a younger man.

SUMMARY

A brief review of the physiological and pharmacological action of testosterone has been given. The chief indication for the use of male sex hormone is in the replacement therapy of the prepuberal and postpuberal castrates. Being a replacement therapy it must be continued for long periods of time and like any other endocrine preparation it does not stimulate the gland to function of its own accord thereafter. Other therapeutic uses of male hormones have also been discussed. One should never use testosterone propionate without knowing its limitations and dangers.

BIBLIOGRAPHY

Goodman, L., and Gilman, A.: The Pharmacological Basis of Therapeutics, pages 1205-1212. New York, The Macmillan Co., 1941.

Hamilton, James B.: Therapeutics of Testicular Dysfunction, pages 253-271, chapter 17 of Glandular Physiology and Therapy, American Medical Association, 1942.

Moore, C. R.: Biology of the Testes, in Allen, E.; Danforth, C. H., and Doisy, E. A.: Sex and Internal Secretions. Baltimore, Williams & Wilkins Co., 1939, chap. 1.

Hamilton, J. B., and Hubert, G.: Effect of synthetic male hormone substance on descent of testicles in human cryptorchidism, Proc. Soc. Exper. Biol. & Med. 39:4-5 (Oct.) 1938.

Greene, R. R., and Ivy, A. C.: The experimental production of intersexuality in the female rat with testosterone, Science 86:200-201 (Aug. 27) 1937.

Sullivan, James M., and Munslow, Ralph A.: Gynecomastia, J.A.M.A. 118:1443 (April 25) 1942.

Brown-Sequard, C. E.: Des effets produits chez l'homme par des injections sous-cutanees d'un liquide retire des testicules frais de cobaye et de chien. Compt. rend soc. de biol., 1889, 1:420-430.

Creevy, C. D., and Rea, C. E.: The effect of testosterone propionate on benign hypertrophy of the prostate gland, Urol. & Cutan. Rev. 44:430-439, 1940.

Hamilton, J. B., and Gilbert, J.: New conception of etiological factors in the production of symptoms observed in benign prostatic hypertrophy: mechanism of control by male hormone substance, Tr. of the Western Branch Soc. of the Am. Urol. Assn. 144-145, 1938.

Heckel, N. J.: Influence of testosterone propionate upon benign prostatic hypertrophy and spermatogenesis: clinical and pathological study in humans, J. Urol. 43:286-308, 1940.

Howard, J. E., and Vest, S. A.: Clinical experiments with male sex hormones. II. Further observations on testosterone propionate in adult hypogonadism, and preliminary report on the implantation of testosterone, Am. J. M. Sc. 198:823-827 1939.

McCullagh, E. P.: Treatment of testicular deficiency with testosterone propionate, J.A.M.A. 112:1037-1044, 1939.

Vest, S. A., and Howard, J. E.: Clinical experiments with androgens. IV. A method of implantation of crystalline testosterone, J.A.M.A. 113:1869-1872, 1939.

Hormones and Carcinoma of the Prostate*

C. D. Creevy, M.D.
Minneapolis, Minnesota

CARCINOMA of the prostate is a disease to be dreaded. It accounts for one-fifth of the obstructions at the vesical neck (Young) and has become much commoner in recent years. This is borne out by the figures of Duff, who found that it increased as a cause of death among the male policyholders of the Metropolitan Life Insurance Company, from 0.8 per 100,000 in 1917 to 3.7 in 1928. Moreover, Moore demonstrated carcinoma of the prostate at autopsy in 21 per cent of a considerable series of males past forty.

It seems, however, that the increased frequency of prostatic cancer is due, not to heightened individual susceptibility, but to increased longevity. Thus life expectancy at birth among the industrial policyholders of the Metropolitan Life Insurance Company increased from 46.6 years in 1911 to 63.4 years in 1941; since the average age at which carcinoma of the prostate is discovered is above 60, this means a much greater number of people are exposed to the disease by virtue of their age, if these figures can be applied to the general population. That they can be so applied is indicated by the fact that the number of males living past the age of 65 in the United States doubled between 1911 and 1935.

One may summarize these facts by saying that a man of 65 today is no more likely to have the disease than was his great grandfather at the same age, whereas a male child born today is far more likely to survive into the cancer age than was his great grandfather. In any case, the physician of today has to recognize and treat a great many cancers of the prostate.

Another unfortunate aspect of prostatic cancer is that it is usually discovered late in its course. Thus Barringer found but 4.5 per cent of 351 prostatic cancers localized in and about the prostate, while Young (reported by Colston and Lewis) regarded only 3.4 per cent of 1040 cases as suited to a radical operation aimed at cure. Further evidence is to be found in Bumpus' observation that about one fourth of his patients had demonstrable metastases to bone when first seen.

This late discovery is attributable to several factors: The tumor causes no symptoms until it becomes large enough to produce obstruction at the vesical neck, or until it involves other structures and causes pain. It grows so slowly that the detrusor muscle has plenty of time for hypertrophy; this delays the onset of obstructive symptoms, as does the fact that three-fourths of prostatic neoplasms originate in the posterior lamella of the gland, at a relatively great distance from the urethral lumen. Further, the symptoms of obstruction are indistinguishable from those due to benign hypertrophy, and patients are likely to regard them as normal accompaniments of old age, and to defer consultation until they become intolerable, which usually takes a long time. Adding to these difficulties is the fact that about one-fourth are concealed from the examining finger by surrounding or intervening benign hypertrophy.

Thus we see that, at present, only about three to four per cent are even potentially curable by radical perineal prostatectomy. This percentage can be increased by educating patients to consult their physicians at the first sign of obstruction to urination, and by educating their physicians to refer to surgeons trained in perineal surgery those patients who have localized hard nodules in the prostate. Such patients should be treated by perineal exposure of the prostate and excision of the nodule, which is submitted to study with the aid of fast frozen sections by a competent pathologist. If the nodule proves to be cancer, radical perineal prostatectomy may then be done with an even chance of cure (Young).

In the meantime, what of the other 96 per cent whose cancers have extended locally or metastasized, so that radical operation cannot possible cure them? In the recent past, treatment in these circumstances has been based upon the degree of obstruction. When it is absent, irradiation, both interstitial and external, has been helpful in causing regression of the growth and amelioration of symptoms. Its by-effects are unpleasant, and it has frequently failed to give satisfactory relief. Pain from metastases which have resisted irradiation has at times yielded to the subarachnoid injection of alcohol or to cordotomy.

Troublesome obstruction is best dealt with by transurethral resection. By combining these methods, one can promise the average patient a year or so of comfort, and can hope that a few will secure relief for several years. This is, of course, not a pleasant picture.

It has long been known that the prostate is profoundly influenced by some of the endocrine glands, but only recently has Huggins succeeded in putting that knowledge to good use in prostatic cancer. It has been known for a very long time that castration of the immature male prevents development of a normal adult prostate, and that castration of the adult causes simple atrophy of the gland. In 1915 Cushing observed that removal of the anterior pituitary produced atrophy of the testes and of the accessory sex organs (penis, prostate, seminal vesicles). This has been substantiated by many subsequent investigators, some of whom have shown that the atrophy of the accessories (but not of the testes) after hypophysectomy, can be prevented or corrected by the administration of testosterone. This whole chain of evidence demonstrates that the anterior pituitary presides over the development and maintenance of the testes which, in turn, govern the prostate and associated organs.

There is other experimental evidence,† much of it conflicting, bearing upon this relationship, but it can be mentioned only briefly here. Thus, various investigators have apparently shown that, *under some circumstances*, the administration of male hormone or fractions thereof (testosterone, inhibin) produce enlargement or shrinkage of the prostate, while anterior pituitary and anterior pituitary-like substances may be without effect or may cause enlargement of the prostate. Others have observed prostatic hypertrophy to follow the administration of estrogens, while still others have claimed to cure hypertrophies with these preparations. These experimental enlargements are histologically unlike their clinical counterparts.

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*From the division of urology, department of surgery, the University of Minnesota Medical School.

†This is reviewed in some detail by Creevy, C. D., and Rea, C. E., in "The effect of testosterone propionate on benign hypertrophy of the prostate."

Another interesting but as yet imperfectly understood phenomenon is the behavior of the enzyme, phosphatase, in prostatic carcinoma. Kutscher and Wolbergs found this substance in larger amounts in normal adult prostatic tissue than in any other organ, and the Gutmans and Sproul found it increased in metastatic deposits from prostatic cancer. Gutman, Barringer and Woodard, and Huggins found the acid phosphatase of the blood serum increased in the presence of metastases to bone from the prostate.

Pondering these facts, and mindful of the old observations that 20 per cent of inoperable cancers of the female breast regressed after oöphorectomy, as well as the claim that certain cases of prostatism were relieved by orchidectomy, Huggins suspected that the cells of prostatic carcinoma, like those of the normal gland, might be influenced by male hormone. Putting the idea to the test, he found that 60 per cent of patients suffering from prostatic cancer with metastases to bone were relieved of pain, often with regression or disappearance of urinary symptoms, and shrinkage and softening of the primary lesion. In successful cases, the acid serum phosphatase fell toward normal levels, and X-rays demonstrated, after fairly long periods, definite regression of metastases to bone. In some relief has lasted thirty months or more.

Administration of testosterone to the patient relieved by castration was followed by recurrence of symptoms. Administration of estrogens to the intact patient with prostatic carcinoma yielded results similar to those of castration, but caused some hypertrophy of the breasts.

Huggins' results have been verified by many others. Munger has had similar but less striking results from heavy irradiation of the testes, while Herbst has secured gratifying palliation from alpha estradiol and stilbestrol. Kearns and his associates have substantiated Herbst's reports, and Herbst, Heckel, and Shenken, Burns, and Kahle, comparing the histological character of carcinoma of the prostate before and after the administration of estrogens, have found evidences of very impressive regression.

It is to be emphasized that these results are obtained in carcinoma, and *not* in benign hypertrophy, and that the results are by no means uniform. Failures are attributed by Huggins to the manufacture of male hormone in extragonadal foci such as the adrenals. It also appears that the success of the estrogens depends upon a sort of pharmacological castration. Heckel has demonstrated impotence and aspermia in males given estrogens, and has found evidence of testicular atrophy by aspiration biopsy. Presumably the estrogens inhibit the activity of the anterior pituitary which, in turn, leads to atrophy of the testes with cessation of secretion of male hormone.

I have preferred to avoid castration until the full effects of the prolonged administration of estrogens can be determined, both because even old men dislike giving up their testes, because many have hot flashes, edema of the feet and legs, and a feeling of inferiority after castration, and because the administration of estrogens is easy, inexpensive, and readily controllable. One can give from one to five milligrams of stilbestrol orally each day, or a similar dose of alpha estradiol intramuscularly twice a week (Herbst), or can implant pellets of the latter drug subcutaneously once in six weeks in patients who are intolerant to stilbestrol, or who cannot or will not come twice weekly for injections (Kearns).

My own experience with about sixty cases is still too meager to permit the drawing of very definite conclusions, but one can say with conviction that the work of Huggins and his followers constitutes a major contribution to the comfort of old men, and that its full possibilities remain to be explored. In the successful case, pain from metastases disappears first, usually rather quickly, but sometimes over a period of from six to eight weeks. Simultaneously or subsequently there is usually some improvement in the function of the bladder, and some reduction in the size of the prostate with lessening of induration, can often be detected. The acid serum phosphatase falls toward normal, and the weight increases as the appetite improves. Some investigators have reported disappearance of all of the characteristics of prostatic cancer on rectal examination, and of metastases to bone on X-ray examination. I have seen both regress but have not seen either one disappear.

It is as yet impossible to select in advance those patients who will be benefitted by castration or by the administration of estrogens, nor is it possible to predict how long the beneficial effects will last, although some of Huggins' patients were free of symptoms as long as thirty months after castration.

It seems permissable to recommend that estrogens be tried in every case of prostatic cancer not confined to the gland itself and that, if they fail, castration be performed. This operation is, of course, to be avoided except in the presence of absolutely unmistakable cancer.

Bibliography

1. Barringer, B. S.: Prostatic carcinoma, J. Urol. 33:616-620, 1935.

2. Barringer, B. S., and Woodard, H. Q.: Prostatic carcinoma with extensive intraprostatic calcification, Tr. Am. Assn. G. U. Surg. 21:363, 1938.

3. Bumpus, H. C.: Clinical study of 1000 cases of carcinoma of the prostate, Surg., Gynec. & Obst. 43:150-155, 1926.

4. Colston, J. A. C., and Lewis, L. G.: Carcinoma of the prostate, a clinical and pathological study, South. M. J. 25:696-700, 1932.

5. Duff, J.: Cancer mortality, bladder, kidney, and prostate. 1917-1928, J. Urol. 32:346-353, 1934.

6. Gutman, A. B., and Gutman, E. B.: An "acid" phosphatase occurring in the serum of patients with metastasizing carcinoma of the prostate gland, J. Clin. Invest. 17:473, 1938.

7. Gutman, E. B., Sproul, E. E., and Gutman, A. B.: Significance of increased phosphatase activity of bone at site of osteoblas-

tic metastases secondary to carcinoma of prostate gland. Am. J. Cancer 28:485, 1936.

8. Heckel, N. J., and Steinmetz, C. R.: The effect of female sex hormone on the function of the human testes. J. Urol. 116:319-321, 1941.

9. Heckel, N. J., and Kretschmer, H L.: Carcinoma of the prostate treated with diethylstilbestrol: Histologic alterations. J.A.M.A. 119:1087, 1942.

10. Herbst, W. P.: The effect of estradiol dipropionate and diethylstilbestrol on malignant prostatic tissue, Tr. Am. Assn. G. U. Surg. 35:195-202, 1941.

11. Huggins, C. B., and Hodges, C. V.: Studies in prostatic cancer. Cancer Res. 1:293-297, 1941.

12. Huggins, C. B., and Stevens, R. E.: The effects of castration on advanced cancer of the prostate gland. Arch. Surg. 43:209-223, 1941.

13. Kearns, W. A., Bruskewitz, H. W., and Flaherty, W. A.: Treatment of carcinoma of the prostate with estrogens, Wis. M J. 41: July 1942.

14 Kutscher, W., and Wolbergs, H.: Prostataphosphatase, Ztschr f. physiol. Chem. 236:237, 1935.

15. Moore, R. A.: Morphology of small prostatic carcinoma. J. Urol. 33:224, 1935.

16. Munger, A. D.: Experiences in the treatment of carcinoma of the prostate with irradiation of the testicles, J. Urol. 46:1007. 1941.

17. Shenken, J. R., Burns, E. L., and Kahle, P. J.: I. The effect of diethylstilbestrol and diethylstilbestrol dipropionate on carcinoma of the prostate. II. Cytological changes following treatment, J. Urol. 48:99-112, July 1942.

18. Young, H. H.: The radical cure of cancer of the prostate. Surg., Gynec. & Obst. 64:472-484. 1937.

A Letter from the Chief of Gasoline Rationing to All Physicians of U. S.

"In the East Coast Gasoline Rationing program, made necessary by the shortage of transportation facilities for petroleum products, the indispensability of your profession was recognized by its inclusion in the categories of persons eligible for preferred mileage, that is, necessary occupational mileage in excess of 470 miles a month. Now the Office of Price Administration has been ordered by Mr. William Jeffers to institute and administer a nationwide mileage rationing program for the express purpose of conserving our rubber-borne transportation. In framing the Regulations for the new program, your profession was one of the first to be provided for.

"If we are to carry out our double task of preventing a collapse of our military and civilian transportation, we must have the complete coöperation of those groups of persons whose driving is deemed essential to the war effort. Our immediate aim is to attain the 5,000 mile national mileage average set by the Baruch Report as the maximum possible in light of the dire rubber shortage. Our experience with the East Coast program tells us that the preferred categories use one half of the gasoline consumed, though they constitute less than one fourth of the total number of automobile operators. Clearly, then, the great savings of rubber on a nationwide scale must be made in the preferred categories.

"Under the Regulations, governing the mileage rationing program, physicians are eligible for preferred mileage if their essential occupational needs exceed 470 miles a month and if the mileage is needed for regularly rendering necessary professional services. Mileage traveled daily or periodically between home or lodging and a fixed place of work is not considered preferred. Physicians who conduct their practices in offices, as many specialists do, are not eligible for preferred mileage.

"Without question or hesitation, doctors have been and will be granted all the gasoline needed to carry out their professional work. We hope that they will regard their concrete symbol of their indispensability, the C book, as a moral obligation and not as a personal privilege. From another point of view, the C book is part of a doctor's equipment; it should not be used for anything but the work of humanity.

"When nationwide gasoline rationing begins, there are certain concrete things a doctor can do to live up to the high ethical standards set for him by his own profession:

"1. At the time of first issuance of rations, he can so carefully compute his necessary mileage as to make a B book adequate for his purposes though he might easily make out a case for a C book, which might be granted to him without question by his local War Price and Rationing Board eager to provide for physicians.

"2. In the computation of his mileage, he can religiously adhere to the provision of the Regulations, which makes 150 miles of his basic ration available for occupational purposes. Moreover, he can help mightily in establishing the principles that only 90 miles of the basic ration are to be used for home necessary use and that there is no provision whatever in any ration for 'pleasure driving.'

"3. Conversely, if he should be granted a C book, he can return to the local board, at the end of the three months period, all unused coupons accruing to him as a result of a quite natural overestimation of needs or of overgenerous 'tailoring' by his board, instead of using such coupons for nonessential purposes. The moral effect of such an act on his fellow citizens will be incalculable.

"4. He can set an example by scrupulously observing the 35 mile speed limit, except in cases of emergency, in spite of the fact that doctors could easily 'get away with it.'

"5. Should he be assigned to a hospital, clinic or institution after a ration card for calling on his private practice has been issued, he can use public means of transportation at the price of personal inconvenience.

"6. He can refrain from any kind of driving whatever which might appear to be nonessential in the eyes of the public.

"Doctors are the leaders and molders of public opinion in their communities. If the average man has any reason to believe that the professional men whom he regards with great respect are indifferent or hostile to the mileage rationing program, it will be difficult, if not impossible, to make it effective. Conversely, if doctors as a group observe the letter and spirit of the Regulations, they will be a powerful force in making this absolutely mandatory war measure serve its purpose. We know that we can rely on the support of your profession, which has demonstrated its patriotism, ability and unselfishness at every opportunity.

"JOHN R. RICHARDS,
"Chief Gasoline Rationing Branch, Office of Price Administration."

"Prefabricated Eschar" or Bandage, Containing Sulfonamide, for Treatment of Burns*

William G. Clark, Ph.D.
Ernest A. Strakosch, M.D.
Minneapolis

Logan N. Leven, M.D.
St. Paul, Minnesota

PICKRELL[1] has described an aqueous solution for the treatment of burns, in which 3 per cent sulfadiazine in 8 per cent triethanolamine is sprayed over the burned area periodically for some fifty times over a period of four days, after which a translucent pliable eschar is formed from which sulfadiazine is liberated into the tissues. He used the treatment for 100 cases, and described only one infection.

Since then many others have used the method. One worker[2] has even recommended the method as the treatment of choice as a standard routine for handling burns to be adopted by the United States armed forces. Several recent workers[3,4,5] have criticized the method as being no particular improvement over other methods. The objections are made that the eschar lacks flexibility, adherence, durability, and loss of effective concentrations of sulfadiazine. It curls and lifts away from the margins of the burn, permitting infections to develop at these areas. Lastly, its application is laborious, necessitating too much nursing care to make it of practical importance, especially in the treatment of burns en masse.

The Lederle Laboratories distributed for experimental purposes, a sulfadiazine-triethanolamine aqueous solution, modified by the addition of water-soluble methyl cellulose ("Methocel").** Methyl cellulose solutions dry to form a water-miscible cellophane-like film. This solution had certain advantages over the original in that it dried more rapidly, and the resulting film was stronger and more durable.

This methocel solution was applied to a series of 10 burn cases in the Ancker Hospital, St. Paul, using 8 to 20 coatings applied consecutively. The method still proved to be laborious, the resulting eschars were not flexible enough, and curled and lifted away from the margins of the burns, frequently allowing infections to develop beneath these areas.

It then occurred to us that the difficulties might be overcome by preparing prefabricated films or synthetic "escharotic bandages," made from a similar solution which had been dried in sheets in which a fabric of some sort was embedded as a binder to lend strength, flexibility, and durability. This concept has been developed and after several months of experimental study, is described here as a preliminary note.

A water-soluble film forming substance such as methyl cellulose, is added to water in concentrations of 1 to 8 per cent, depending upon the viscosity of the methyl cellulose used. The solutions also contain sulfonamide solubilizers, emulsifiers, detergents, an anti-oxidant, a preservative, a sulfonamide, and an "anti-inhibitor." One such solution, for example, contained 5 per cent methocel, 0.1 per cent aerosol, 10 per cent triethanolamine, 1 per cent sodium lauryl sulfate, 1 per cent propylene glycol, "Carbowax" (Amer. Cyanamid), or sorbitol, 2 per cent sulfadiazine or sulfathiazole, 2 per cent urea, and 0.2 per cent thiourea or sodium acid sulfite. The urea acts as an antagonist of sulfonamide inhibitors and of sulfonamide-fastness, and has been described by us in a series of papers.[6,7,8] This solution was dried into films, embedded in which were various fabrics in such a way that the fabric was well-covered with the dry methocel film. Muslin, gauze, cheese-cloth, and the like, proved unsatisfactory because they were too stiff when dry. This was also the case when muslin was used with the solution on one case at the Ancker Hospital. Fine meshed rayon, nylon, and silk such as in women's stockings, hat veiling, etc., proved satisfactory, because the resulting "eschars" did not tear when wet, were adherent, very flexible, and durable on experimental animals. Cup tests on agar plates of staphylococci showed that the sulfonamides diffused freely from the films. Chemical studies have shown that the concentrations of sulfonamide in the films are of the order of 20 per cent and preliminary studies indicate that the bandages can be sterilized.

In a series of experiments involving some 20 rabbits, extensive third degree burns were produced in a standard way which will be described elsewhere. They were debrided and the prefabricated "escharotic bandages" applied to the moist burns. Such eschars were compared with controls prepared by applying the solution, and by applying preformed films made from the solution, but without the embedded fabric. The prefabricated "escharotic bandages" with embedded fabric proved far superior to the other methods in that they remained on the burns for as long as three weeks, where the others lifted or curled away from the burns, as on humans, allowing infections to develop in about 50 per cent of the cases within ten days. Healthy granulation tissue developed better under the fabric-embedded eschars because of the lack of infection, and healing time was shorter. These results will be described in detail in the completed report.

Animal and clinical studies are in progress, in which certain improvements of these prefabricated "eschars" are being studied. We believe that this method may be eventually a useful adjunct in surgical conditions other than burns, and that it may prove of practical importance, since the bandages can be easily packaged in rolls, sheets, or strips, for immediate application both for first aid treatment, and as a surgical manipulation.

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*From the department of zoölogy, the division of dermatology and syphilology, and the department of surgery, University of Minnesota.

**Kindly supplied to us by Dr. Benjamin Carey, associate medical director, Lederle Laboratories, Inc., Pearl River, New York.

While we were preparing this preliminary note, a note by Pickrell[9] appeared in which he describes the use and preparation of a preformed sulfonamide-methocel film. Not knowing of this development, we had studied identical films, and had discarded them in favor of the above described bandages with embedded fabrics, since the films without such fabrics tore too easily when wet, dissolved too rapidly on the wounds, necessitating frequent renewals, and were not as flexible and adherent.

REFERENCES

1. Pickrell, K. L.: A new treatment for burns, Bull. Johns Hopkins Hosp. 69:217 (Aug.) 1941.

2. Fox, T. A.: Newer concepts in the treatment of burns, with suggestions for the management of wartime thermal injuries, U. S. Naval Med. Bull. 40:557 (July) 1942.

3. Adams, W. M., and J. K. Crawford: Sulfadiazine treatment of burns, Southern Surgeon 11:324 (May) 1942. (Also personal communication).

4. Thiessen, N. W., and O. S. Steinreich: The local treatment of burns in the army, Military Surgeon 91:208 (Aug.) 1942

5. Annotations: Lancet 142:566 (May) 1942.

6. Tsuchiya, H. M., D. J. Tenenberg, W. G. Clark, and E. A. Strakosch: Antagonism of anti-sulfonamide effect of methionine, and enhancement of bacteriostatic action of sulfonamide by urea. Proc. Soc. Exp. Biol. & Med. 50:262 (June) 1942.

7. Tenenberg, D. J., H. M. Tsuchiya, W. G. Clark, and E. A. Strakosch: In vitro effect of sulfonamides plus urea on Escherichia coli in presence of para-aminobenzoic acid, ibid: (Nov.) 1942, in press.

8. Tsuchiya, H. M., D. J. Tenenberg, E. A. Strakosch, and W. G. Clark: In vitro effect of urea sulfathiazole combination on sulfathiazole-resistant staphylococci, ibid: (Nov.) 1942, in press.

9. Pickrell, K. L.: A sulfonamide film for use as a surgical dressing, Bull. Johns Hopkins Hosp. 71:304 (Nov.) 1942.

Book Reviews

1943 Daily Log for Physicians, designed by a physician; Champaign, Ill., Colwell Publishing Co. Price, $6.00.

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The *Daily Log* is a system of records for the physician. It consists of a loose-leaf ledger or day book in which he can keep a brief, simple, accurate financial record of names and addresses of patients, hours and kinds of services rendered, charges, cash receipts and deferred payments day by day. Each page has a two-months calendar.

Following each month's pages are sheets for a summation of the month's transactions, record of inoculations, breakdown of expenses under fifteen headings, spaces for recording of balances. These in turn are gathered at the end of the book into an annual summary which will simplify greatly the drawing up of the income tax report in the spring of the following year. As the publishers remind, this year with taxes high and time at a premium, physicians who never before would "bother" with accurate and efficient records, will decide to keep them.

There will be found in the *Daily Log* pages for the surgical record of the patient, the diagnosis, operation and result, a narcotics record, social security tax analysis with deductions for old age benefit and unemployment insurance, a highly detailed OB record and waiting list, "reminder" division for the recording of notifiable diseases and, finally, a record of deaths attended.

The whole comprises an easy method of bookkeeping, tailored to the physician's needs, acting as a diary, legal aid, ledger, balance sheet, tax data memorandum and guide, an indispensable office assistant for the city or country practitioner. The physician who follows its index and maintains his entries faithfully will realize that he has an instantaneous bird's-eye view of his practice at all times.

Synopsis of the Preparation and Aftercare of Surgical Patients, ILGENFRITZ-PENICK-MAES; St. Louis: C. V. Mosby Co.

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This is the type of book that every practitioner, be he physician or surgeon of little or much experience, would like to have at hand for quick reference. It does not deal with major surgery but the many little details before and after that make surgery a success. In the past, instruction of this kind has usually been given by word of mouth in the wards and dressing rooms, but interns found that procedures differed among the various operators. So far as it is possible to describe the latest and universally accepted methods this little book serves a useful purpose.

Morris' Human Anatomy: *A Complete Systematic Treatise,* edited by J. PARSONS SCHAEFFER, A.M., M.D., Ph.D., Sc.D., and revised by a corps of contributors; brown fabrikoid, gold-stamped, 1515 pages plus index of 118 pages, 1155 illustrations (many in color); Philadelphia: the Blakiston Company, 1942, 10th edition, revised and re-set. Price, $12.00.

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Physicians and workers in the basic medical sciences in Minnesota and the Northwest will be particularly interested in this tenth edition of Morris' *Human Anatomy* because of the intimate association with the University of Minnesota Medical School which the text has had for years. Dr. Clarence M. Jackson, now emeritus professor of anatomy in the University of Minnesota, had served as editor of the work through several editions, and the work of Dr. Richard E. Scammon, Distinguished Service professor in the University of Minnesota, has been known and valued internationally for many years. Dr. Jackson retired from the editorship of the tenth edition of this text, although he is represented in the section on the digestive system. Dr. Scammon continued as a contributor to the section on developmental anatomy. To this section he has added several new illustrations, some of which were executed in his own laboratory in Minneapolis by artists who were working under his direction on his exhaustive new series of volumes on human growth, soon to be published in the East. Dr. Scammon's contribution to this volume is marked by interesting and effective new forms of graphic illustrations which are difficult to describe in a review, but which are readily perceived when once they are inspected. Another faculty member of the University of Minnesota who aided in revision of this book is Dr. Raymond F. Blount, assistant professor of anatomy. He assisted Dr. Jackson in a thorough recasting of section 10 (digestive system).

The new editor of the volume is Dr. J. Parsons Schaeffer, professor of anatomy and director of the Daniel Baugh Institute of Anatomy in the Jefferson Medical College in Philadelphia. His associates all are prominent workers in the field of anatomy in as many as ten important medical colleges in the United States and Canada.

In the text itself the BNA terminology in Anglicized form is generally employed, the BNA Latin forms being included but set off in brackets. But the newest revision (the Jena Nomina Anatomica) of the BNA also is represented when that part of it which differs from the older BNA is encountered. The thoroughness of this present revision is reflected in the recent dates of references to literature in the lists appended to each section of the book. Many of the papers referred to were first printed less than three years ago. Every section in the book has been revised, and some have been entirely rewritten.

The publishers are entitled to commendation for the fine printing and the superior reproduction of illustrations which characterize this volume. The work itself is now the most recent American textbook of anatomy extant: it was published on June 17, 1942.

The
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LANCET

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The Official Journal of the

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W. A. Jones, M.D., 1859-1931
W. L. Klein, 1851-1931

Minneapolis, Minnesota, December, 1942

THE SEX HORMONES IN MEDICINE

The problem of the extension and application of physiological knowledge in the field of the endocrinology of sex and sexual functions is one of great clinical interest. The chemistry of the human animal is being revealed, slowly and incompletely, as a very complicated phenomenon. Piece by piece the chemical puzzle of living systems is being put together. The search for the proper niches into which various pieces fit has been, and still is, an arduous one. Years of investigation lie back of almost every advance that is made. In no sphere of human physiology is this more true than in endocrinology, perhaps because the hormones which endocrine organs secrete act as regulators, catalysts, or intermediates in complicated chemical reactions which are themselves either unknown or at best poorly understood.

As physicians we are impatient of the slowness with which useful scientific knowledge is accumulated, but as students of science we must insist upon the careful and patient establishment of one fact after another. The ground work of any science must be sound so that its superstructure may be secure.

An unknown number of clinical problems connected with the sex hormones still await study. A few such problems have ben solved. Many more appear to be tantalizingly near to solution.

This issue of the Journal-Lancet is devoted to a summary of much that is known about the sex hormones. It is being presented for a number of reasons, not the least of which is to indicate the complexity of the problem of the clinical use of sex hormones. The hormone therapy of dysmenorrhea affords an interesting example of the problems encountered. In one study reported in this issue, the exhibition of an active hormone resulted in a sizeable proportion of subjective reports of improvement. However, the administration of an absolutely inert placebo to an equal number of comparable patients, serving without their knowledge as controls, resulted in about the same degree of relief. Obviously, the relief reported by the group on active medication must be interpreted, on the basis of this experiment, as having been due to psychotherapy, spontaneous remission, or other fortuitous factors. Clinical therapeutic investigation is surrounded with many difficulties, and especially so when subjective signs have to be employed as criteria of effect. Large sources of error are present whenever objective quantitative measurements and adequate control studies are not made, either on the same or other patients. Too frequently physicians have jumped to erroneous conclusions because they have not observed these precautions.

Controlled scientific clinical study of sex endocrinology is urgently needed. A great deal of further advance is already in sight, but it will not be achieved without painstaking and expensive research. It is fortunate that such studies are being carried out today in numerous University laboratories and clinical departments. These agencies are being assisted greatly by pharmaceutical manufacturers but it is important to the medical profession and to the public that the major role be played by detached scientists.

It is equally important that the medical profession obtains its information about newer developments in endocrinology from sources other than advertising circulars. There is a need and a place for advertising, but it does not legitimately extend to the purveying of fundamental information to the physician. The medical journals have not in the past adequately met this need for digests of new knowledge. The material in this issue is presented partly to fill this gap. An important contribution lies in the fact that negative results have been reported as fully as the positive ones. This is something that advertising literature for physicians rarely does.

It is to be hoped that in the future this and other medical journals will be able to meet the needs of the medical practitioner more adequately, in bringing to him the digested results of newer studies in the several fields of medicine in which important and even revolutionary advances are being made. Such journals can and ought to be the main sources of postgraduate information and education for practicing physicians.

M. B. Visscher.

THE MEDICAL TICKER TAPE

Another year is drawing to a close; and from a well established habit we meditate a bit about events of the past and do some conjectural thinking as we plan for the future.

We may look upon the past with approval or disapproval, but we cannot change it. History is like that —when once written it cannot be altered. The transactions of each day have been indelibly recorded on life's ticker tape and right or wrong it must stand; because, according to the rules the transaction is consummated as made. The tape ticks on and new quotations appear as the traders, who participate in this exciting game of weaving events into history, endeavor to correct or improve their positions. In any event, the pattern of tomorrow cannot be the same as that of today.

Medical journals in a sense are the ticker tapes of medical progress. They record the medical news of the times, transactions of societies and articles of scientific interest, but once published these cannot be recalled or even changed an iota. If a surgical procedure becomes obsolete or a new method of treatment is found, its announcement must of necessity wait for its discovery and appear in a later issue. Scientific facts are axiomatically accurate, correct and unchangeable, but our scientific knowledge is quite another matter. It is a fluid commodity subject to change with every new ray of light that reaches our telescopes from previously undiscovered stars of information. A medical journal is an astronomer in the observatory of the medical heavens that broadcasts from this vantage point the results of new light on obscure questions. It reaches the reader like a ticker tape furnishing with promptitude the latest information available at frequent intervals.

A. E. H.

DOCTORS ALL

The title of "doctor" was originally applied to accredited teachers in the early Middle Ages, in fact the word itself is a Latin one meaning "teacher". It was a term of great respect and for that reason was also applied a little later to the Fathers of the Church. No one could use it without authority and for many years it continued to be the designation of those who had achieved the highest eminence in either or both of the two professions.

Things have changed since then. Today there appears to be no legal impediment to the use of the title by anyone and so we have doctors of medicine, dentistry, law, theology, veterinary surgery, music, letters, as well as osteopathy, chiropractic, et cetera.

The suggestion has been made that we in medicine drop the title entirely and use M.D. after our names instead. It is worth considering.

G. C.

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News Items

The annual meeting of the American Student Health Association, originally scheduled for Cincinnati, December 29-30, 1942, has been cancelled.

Dr. Meredith B. Hesdorffer, Missoula, Montana, has been called to active duty in Washington, D. C., as assistant surgeon with the U. S. Public Health Service.

Dr. R. A. Whitney, formerly of Cambridge, Minnesota, is now stationed at Ft. Sam Houston, Texas.

Dr. E. J. Huenekens has been named chairman of the health and medical care section of the central planning and research division, Minneapolis Council of Social Agencies. He succeeds Dr. Gaylord W. Anderson who resigned to enter the armed services.

Dr. James Gordon Bateman, Giffen, Montana, is now an assistant surgeon in the navy. He has the rank of lieutenant, junior grade, and is assigned to the National Naval Medical center at Bethesda, Maryland.

Dr. Paul Boman, Duluth, was named president of the Minnesota Society of Internal Medicine at the annual meeting held in Duluth recently. Dr. B. T. Horton, Rochester, was elected vice-president and Dr. R. A. Johnson, Minneapolis, secretary-treasurer.

Dr. C. H. Coombs, Bemidji, Minnesota, is now a lieutenant in the navy, stationed at Great Lakes, Illinois.

Dr. Charles E. Lyght, director of the Carleton College Health Service, Northfield, Minnesota, has accepted a position as director of the department of health education of the National Tuberculosis association, New York. He expects to assume his new duties about January 1.

Dr. A. G. Sanderson, Granite Falls, Minnesota, has been appointed a resident physician at the Ah-Gwah-Ching state sanatorium for tubercular patients.

Dr. M. O. Nesheim, Emmons, Minnesota, has joined the medical corps of the U. S. Air Force.

Dr. T. F. Crabb, Cass Lake, Minnesota, a member of the staff of the Indian hospital, has left for Brazil, South America.

The clinical congress of the American College of Surgeons, first postponed from October to November, and moved to Cleveland from Chicago, has now been cancelled.

Dr. R. F. Walker, Livingston, Montana, has reported for active duty as a lieutenant, junior grade, in the navy medical corps. He is stationed at Mare Island. Dr. Walker has been city health officer since 1941.

Dr. W. F. Muir, Graceville, Minnesota, who for the past five years has been affiliated with the Oliver clinic, is now in the medical corps of the U. S. Army.

The Board of Regents of the American College of Physicians has announced the cancellation of their 1943 Annual Session, which was scheduled to be held in Philadelphia, April 13-16, 1943.

Dr. Orien B. Patch, for the past two years a member of the staff of the Duluth Clinic, has been commissioned a captain in the U. S. Army air force and is now on active duty at the Lincoln air base hospital, Lincoln, Nebraska.

The American Urological Association offers an annual award "not to exceed $500" for an essay (or essays) on the result of some specific clinical or laboratory research in urology. The amount of the prize is based on the merits of the work presented, and if the Committee on Scientific Research deem none of the offerings worthy, no award will be made. Competitors shall be limited to residents in urology in recognized hospitals and to urologists who have been in such specific practice for not more than five years. The selected essay (or essays) will appear on the program of the forthcoming meeting of the American Urological Association, May 31 to June 3, 1943, Hotel Jefferson, St. Louis, Missouri. Essays must be in the hands of the secretary, Dr. Thomas D. Moore, 899 Madison Ave., Memphis, Tennessee, on or before March 1, 1943.

Woman's Auxiliary to the South Dakota State Medical Association

Plans for the ensuing year's work in the various districts of the Woman's Auxiliary to the South Dakota State Medical association, were made at a meeting of the Board held in Madison, November 9. Mrs. John C. Hagin, state president, presided.

The Seventh District medical auxiliary entertained the officers and wives of the medical corps of the Army Technical school (Sioux Falls) at a dancing party at the History club house recently. Mrs. Otto E. Hanson, Valley Springs, was general chairman. About 150 persons attended.

Necrology

Dr. William Byrne Brown, 38, director of the Division of Health Education at Stephens College, Columbia, Missouri, died suddenly November 8, at his home. Dr. Brown joined the staff of Stephens College on September 1, 1936, as assistant to Dr. F. G. Nifong. Upon Dr. Nifong's retirement in 1938, Dr. Brown was named director of Health Education. He was a graduate of West Virginia University and obtained his M.D. from Rush Medical College of the University of Chicago.

Dr. Ralph E. Weible, 64, of Fargo, North Dakota, died November 8 in a Minneapolis hospital. Dr. Weible, president of the Dakota clinic, came to North Dakota in 1894.

Captain Leo P. Martin, 39, of Missoula, Montana, who since last June had been stationed at the Walla Walla (Washington) Army air base with the medical corps, was killed in the crash of a commercial cabin trainer plane near Walla Walla recently.

Dr. A. N. Currie, 69, of Kalispell, Montana, died recently.

The
Journal-Lancet

INDEX TO
VOLUME LXII
New Series
January 1942 - December 1942

The Official Journal of the
North Dakota State Medical Association
South Dakota State Medical Association
Montana State Medical Association
Sioux Valley Medical Association
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American Student Health Association

Lancet Publishing Co., Publishers
Minneapolis, Minn.
1942

INDEX OF AUTHORS

A

Abbott, A. W.
Antipyrin 48
(Reprinted from Northwestern Lancet, October, 1885)

Allen, James H.
Staphylococcic Ocular Inflammation 207

Allison, R. G.
Changes in Military Radiology Since the First World War 273

Alway, Robert H.
Medical Management of Megacolon 184

Anderson, John A.
Significance of Adrenal Insufficiency in Childhood 161

Anderson, Karl W.
Blood Pressure as a Factor in Mortality 341

Arnson, Julius O.
Coronary Thrombosis 216

B

Balkin, Samuel G.
Fractures of the Malar-Zygomatic Compound 267

Bier, Robert A.
The Selective Service System and the Practice of Medicine 15

Blanton, Smiley
Incoördination and Tension Due to Anxiety 398

Blumstein, Alex, and Strem, Edward L.
Bilateral Subdural Hematoma in an Infant 214

Bodenstab, W. H.
What the North Dakota Workmen's Compensation Bureau Expects of the Physician 85

Boehrer, J. J., McKinlay, C. A., and Lange, E. H.
Atypical Pneumonia Associated with Rheumatic Endocarditis 75

Boyd, W. L.
Swine Erysipelas and Erysipeloid 211

Boynton, Ruth E.
Some Problems of the College Health Service in a Nation at War 146

Brown, S. A.
Warming and Ventilation in Dakota 44
(Reprinted from Northwestern Lancet, April, 1886)

Bryant, Frank L.
The Relation of the Middle Turbinate to Paranasal Sinusitis 99

Burns, H. A.
The American Indian's Contribution, Food and Drugs 12

C

Cardle, A. E.
Report of Unusual Reactions in Mother and New-born in a Case of Diabetes Mellitus 348

Carey, J. B., and Ylvisaker, R. S.
Gastroscopic Observations in Duodenal Ulcer 394

Carter, J. Bailey
Chest Leads in Coronary Occlusion 254

Clark, William G., Strakosch, Ernest A., and Leven, Logan L.
"Prefabricated Eschar" or Bandage, Containing Sulfonamide, for Treatment of Burns 455

Coe, Frederick O., and Weinerman, E. Richard
The Control of Tuberculosis Among Medical Students 115

Collins, L. L.
The Advantages of Tuberculin Testing Surveys 134

Collins, L. L.
The Significance of the Tuberculin Test 380

Conrad, Justin L.
The Common Use of the Female Sex Hormones 18

Corson, Hiram
Food for Infants 59
(Reprinted from Northwest Medical and Surgical Journal, November, 1870)

Cottam, Geoffrey I. W., and Cottam, Gilbert
Congenital Atresia of the Duodenum 83

Cottam, Gilbert, and Cottam, Geoffrey I. W.
Congenital Atresia of the Duodenum 83

Coventry, W. A.
The Management of the Breech 1

Creevy, C. D.
Hormones and Carcinoma of the Prostate 452

D

Drew, Charles W.
Diabetes Mellitus 56
(Reprinted from Northwestern Lancet, June, 1886)

Drips, Della G.
Relation of Sex Hormones to the Climacterium 437

Dwan, Paul F.
Use of Blood Substitutes 26

E

Ehrenberg, Claude J.
The Clinical Use of Vaginal Smears 24

Eitel, G. G.
Rubber Gloves in Surgery 34
(Reprinted from Northwestern Lancet, January, 1900)

Emerson, Kendall
The Industrial Front 111

F

Faust, Ernest Carroll
Is there an Intestinal Parasite Problem in College Students? 260

Fergusson, F. W.
Presidential Address 334

Fisher, Judson C.
A New Wet Dressing 101

Fowler, Edmund Prince
Should the Hearing of College Students be Tested? 312

G

Galloway, John D. B.
The Treatment of Anterior Poliomyelitis 411

Goehl, R. O.
Eosinophilic Leukemia 252

H

Hansen, Arild E.
Pleurisy with Effusion as a Manifestation of Rheumatic Fever 158

Hansen, Arild E., and Ziegler, Mildred R.
Pediatric Aspects of Endocrine Therapy 180

Hart, B. M.
Address of the President 294

Haugen, John Amberg
The Remote Effects of Hypertensive Toxemias of Pregnancy 350

Henry, Myron O.
Treatment of Scoliosis 69

Hill, A., and Platou, E. S.
Influenzal Meningitis 168

Hill, Alan J., and Platou, Ralph V.
Primary Hepatic Carcinoma in Infancy 191

Hoffman, Max H.
Intersexual Manifestations of Nonendocrine Origin 446

Holand, Harold, and Pleyte, A. A.
The Man of the Future in Tuberculosis Control 112

Howard, L. L., Larson, E. M., and Layne, John A.
Benign Stricture of the Esophagus 304

J

Jones, W. A.
Aconite Poisoning 40
(Reprinted from Northwestern Lancet, December, 1884)

Jordan, Kathleen B.
Tuberculosis Occurring in High Schools 121

Jordan, L. S.
Summary of a Ten-Year Mantoux Program in Rural Minnesota 384

K

Kearney, William, and Richdorf, L. F.
Prothrombin Deficiency in the Newborn as Affected by Vitamin K and by Prelacteal Feeding 155

King, Don
Remarks on the Treatment of Fractures 88

Kovacs, Richard
Physical Therapy in the College Health Service 264
Kuhn, Hedwig S.
Vision Facts for Visual Reasons 240

L

Laird, Arthur T.
Disappearance of Tuberculous Lesions 225
Lange, E. H., Boehrer, J. J., and McKinlay, C. A.
Atypical Pneumonia Associated with Rheumatic Endocarditis 75
Larson, E. M., Layne, John A., and Howard, L. L.
Benign Stricture of the Esophagus 304
LaVake, Rae T.
Obstetrics and Gynecology in 1941 273
Layne, John A., Howard, L. L., and Larson, E. M.
Benign Stricture of the Esophagus 304
Leven, Logan L., Clark, William G., and Strakosch, Ernest A.
"Prefabricated Eschar" or Bandage, Containing Sulfonamide, for Treatment of Burns 455
Levine, Milton, and Polan, C. G.
Sulfanilamide in Influenzal Meningitis 94
Lippman, Emanuel S.
Congenital Hemolytic Jaundice with Hemolytic Crises in Children 188
Long, Esmond R.
The Present Status of the Tuberculin Test 376
Long, W. H.
Cardiac Arrhythmias 220
Lyght, Charles E.
Tuberculosis Control Among College Students, Theoretical and Applied 7

M

Maxeiner, Stanley R.
Emergency Treatment of Fractures 406
Mayo, C. H.
Glandular Tuberculosis 55
(Reprinted from Northwestern Lancet, August, 1890)
Mayo, W. J.
Two Cases in Practice 43
(Reprinted from Northwestern Lancet, November, 1886)
Mayo, W. J., and Mayo, William Worrell
Successful Operation for Large Ventral Hernia 39
(Reprinted from Northwestern Lancet, April, 1888)
Mayo, William Worrell, and Mayo, W. J.
Successful Operation for Large Ventral Hernia 39
(Reprinted from Northwestern Lancet, April, 1888)
McKelvey, J. L.,
Irregular Shedding of the Endometrium 434
McKinlay, C. A., Lange, E. H., and Boehrer, J. J.
Atypical Pneumonia Associated with Rheumatic Endocarditis 75
McQuarrie, Irvine
Impaired Ability to Fabricate Serum Proteins the Chief Cause of Edema in Chronic Constrictive Pericarditis 199
Michelson, Henry E.
Allergy and Resistance in Cutaneous Tuberculosis 250
Millard, P. H.
Foreign Correspondence 62
(Reprinted from Northwestern Lancet, January, 1882)
Millspaugh, J. D.
Address—3rd Annual Meeting of North Dakota Medical Society, May 22, 1889 37
(Reprinted from Northwestern Lancet, July, 1889)
Moss, Arthur J.
Evaluation of Relative Importance of Various Etiological Factors in Asphyxia Neonatorum 170
Myers, J. A.
Clarence Martin Jackson—A Great Physician 142
Introduction on Tuberculosis Control 376
Mynes, Leo H.
Education About Tuberculosis in the 'Teen Age Group 381

N

Nessa, N. J.
Address of the President-Elect 296
Novak, Milan
Use of Sulfathiazole to Eliminate Bacterial Contamination in Stored Plasma 247

O

Ohage, J.
Hydrochlorate of Cocaine in General Surgery 41
(Reprinted from Northwestern Lancet, March, 1885)

P

Parnall, Edward
Traumatic Affections of the Knee Joint 90
Payne, Howard M.
The Incidence of Tuberculosis in Negroes of College Age 400
Peppard, Thomas A.
Internal Medicine in 1941 275
Perez, Jose Antonio
Tuberculosis of the Trachea and Bronchi 138
Petersen, W. E.
The Relation of the Hormones to Lactation 442
Platou, E. S.
Hypoglycemic Shock in an Infant Born of a Diabetic Mother 348
Platou, E. S., and Hill, A.
Influenzal Meningitis 168
Platou, Ralph V., and Hill, Alan J.
Primary Hepatic Carcinoma in Infancy 191
Pleyte, A. A., and Holand, Harold
Man of the Future in Tuberculosis Control, the 112
Polan, C. G., and Levine, Milton
Sulfanilamide in Influenzal Meningitis 94

R

Rea, Charles E.
An Evaluation of the Clinical Use of Male Sex Hormone 449
Reynolds, Chapman
Comparative Therapeutic Value and Toxicity of Various Types of Vitamin D 372
Richdorf, L. F., and Kearney, William
Prothrombin Deficiency in the Newborn as Affected by Vitamin K and by Prelacteal Feeding 155
Rigler, Leo G.
Case Report 24
Infected Cysts of the Lung 195
Rowe, Albert H.
Elimination Diets for the Study and Treatment of Food Allergy 307
Rowe, Paul
Valvular Heart Disease 218
Rowntree, Colonel Leonard G.
The College Health Program and National Defense Optimum Health for All Students 96
Rynearson, Edward H.
Vitamins, the 4

S

Samuels, Leo T.
Important Advances in the Physiology of the Sex Hormones 419
Schermer, Irvin
Abortion and the Law 223
Seham, Max
Why School Children Fail 166
Smith, L. E.
Testing for Tuberculosis in Kentucky 379
Spencer, Edward C.
Antiseptic Surgery at the New York Hospital 50
(Reprinted from Northwestern Lancet, November, 1884)
Stocker, S. M.
Plea for More Frequent and More Careful Examination of the Urine, A 52
(Reprinted from Northwestern Lancet, May, 1887)

Stoesser, Albert V.
  Recent Observations on Hay Fever in Children 174
Stone, A. J.
  After Treatment of Ovarian Patients 35
  (Reprinted from Northwest Medical and Surgical Journal, September, 1870)
Strakosch, Ernest A., Leven, Logan L., and Clark, William G.
  "Prefabricated Eschar" or Bandage, Containing Sulfonamide, for Treatment of Burns 455
Strem, Edward L., and Blumstein, Alex
  Bilateral Subdural Hematoma in an Infant 214
Swan, Kenneth C.
  Advances in the Medical Treatment of Glaucoma 79
Swanson, J. C.
  Injuries of the Ankle 93
Szego, Clara M.
  Methods of Measurement of the Naturally Occurring Sex Hormones 423

T

Terrill, Frank I.
  War Injuries of the Chest 403

W

Waldron, Carl W.
  Fractures of the Mandible 228
Weinerman, E. Richard, and Coe, Frederick O.
  Control of Tuberculosis Among Medical Students, the 115
White, S. Marx
  Reflections on Medicine in Review 33
Winther, Nora
  The Endocrine Factors in Menstruation and Its Relation to Dysmenorrhea 428
Wright, Willard H.
  A Consideration of the Clinical and Public Health Aspects of Trichinosis 389

Y

Ylvisaker, R. S.
  Unusual Cases of Pulmonary Fibrosis, Probably of Allergic Origin 68
Ylvisaker, R. S., and Carey, J. B.
  Gastroscopic Observations in Duodenal Ulcer 394
York, W. H.
  Student Health Auxiliary, A 20

Z

Ziegler, Mildred R., and Hansen, Arild E.
  Pediatric Aspects of Endocrine Therapy 180

EDITORIALS

After the War—What? 387
Age Not Infirmity 243
Another "Week" 417
Bulbless Inflation Technic in Blood Pressure Determination 347
Child Behaviorism 204
Contents and Contributors 148
Cutaneous Testing in Allergy 386
Defense Savings 150
Doctors All 458
Doctor's Responsibility in Wartime, The 272
Fascinator Profilaxis 104
Guillotin, Gatlin and Rockwell 387
Importance of Child Health, The 203
Importance of Preserving Roentgenograms, The 314
Infinite Patience 315
July 272
Leaven of Medical Progress, The 64
Malaria and Malthus 204
Marching to Health 149
Medical Ticker Tape, The 458
National Defense and First Aid 65
National Physician's Committee, The 22
Our Greatest National Waste 271
Passing of Gastrojejunostomy as a Standard Operation for Ulcer 415
Periodic Health Examinations 242
Problem in Mathematics, A 243
Seventy-Two Years of Service and the War 64
Sex Hormones in Medicine, The 457
Standardization of Proctologic Technique 23
Surgery in Warfare 346
Tubercle Bacilli in the Digestive Tract 149
Universal Fingerprinting 416
Vita-Mania 103
War and Children 347

INDEX OF ARTICLES

A

Abortion and the Law 223
  Irvin Schermer
Aconite Poisoning 40
  W. A. Jones
  (Reprinted from Northwestern Lancet, December, 1884)
Adrenal Insufficiency, Significance of, in Childhood 161
  John A. Anderson
Allergic Origin, Probably of, Unusual Cases of Pulmonary Fibrosis 68
  R. S. Ylvisaker
Allergy:
  And Resistance in Cutaneous Tuberculosis 250
  Henry E. Michelson
  Food, Elimination Diets for the Study and Treatment of 307
  Albert H. Rowe
American Student Health Association:
  Proceedings of Twenty-second Annual Meeting 105
  Member Institutions, Addresses and Representatives 107
  Eleventh Annual Report of the Tuberculosis Committee 125
Ankle, Injuries of the 93
  J. C. Swanson
Antipyrin 48
  A. W. Abbott
  (Reprinted from Northwestern Lancet, October, 1885)
Anxiety, Incoördination and Tension Due to 398
  Smiley Blanton
Arrhythmias, Cardiac 220
  W. H. Long
Asphyxia Neonatorum, Evaluation of Relative Importance of Various Etiological Factors in 170
  Arthur J. Moss
Atresia, Congenital, of the Duodenum 83
  Geoffrey I. W. Cottam, and Gilbert Cottam

B

Blood Pressure as a Factor in Mortality 341
  Karl W. Anderson
Blood Substitutes, the Use of 26
  Paul F. Dwan
Breech, the Management of the 1
  W. A. Coventry
Bronchi and Trachea, Tuberculosis of the 138
  Jose Antonio Perez
Burns, for Treatment of, "Prefabricated Eschar" or Bandage, Containing Sulfonamide 455
  William G. Clark, Ernest A. Strakosch, and Logan L. Leven

C

Carcinoma of the Prostate, Hormones and 452
  C. D. Creevy
Cardiac Arrhythmias 220
  W. H. Long
Case Report 24
  Leo G. Rigler
Chest Leads in Coronary Occlusion 254
  J. Bailey Carter
Chest, War Injuries of the 403
  Frank I. Terrill
Childhood, Significance of Adrenal Insufficiency in 161
  John A. Anderson

Children:
  Congenital Hemolytic Jaundice with Hemolytic Crises in 188
    Emanuel S. Lippman
  Recent Observations on Hay Fever in 174
    Albert V. Stoesser
  School, Fail Why? 166
    Max Seham
Climacterium, Relation of Sex Hormones to the 437
  Della G. Drips
Cocaine, Hydrochlorate of, in General Surgery 41
  J. Ohage
  (Reprinted from Northwestern Lancet, March, 1885)
College Health:
  Program and National Defense Optimum Health for All Students, the 96
    Colonel Leonard G. Rowntree
  Service in a Nation at War, Some Problems of the 146
    Ruth E. Boynton
  Service, Physical Therapy in the 264
    Richard Kovacs
Coronary Occlusion, Chest Leads in 254
  J. Bailey Carter
Coronary Thrombosis 216
  Julius O. Arnson
Cysts, Infected, of the Lung 195
  Leo G. Rigler

D

Dakota, Warming and Ventilation in 44
  S. A. Brown
  (Reprinted from Northwestern Lancet, April, 1886)
Diabetes Mellitus 56
  Charles W. Drew
  (Reprinted from Northwestern Lancet, June, 1886)
Diabetes Mellitus, Report of Unusual Reactions in Mother and Newborn in a Case of 348
  A. E. Cardle
Diabetic Mother, Hypoglycemic Shock in an Infant Born of a 348
  E. S. Platou
Diets, Elimination, for the Study and Treatment of Food Allergy 307
  Albert H. Rowe
Dressing, A New Wet 101
  Judson C. Fisher
Duodenum, Congenital Atresis of the 83
  Geoffrey I. W. Cottam, and Gilbert Cottam

E

Edema, Impaired Ability to Fabricate Serum Proteins the Chief Cause of, in Chronic Constrictive Pericarditis 199
  Irvine McQuarrie
Endocarditis, Rheumatic, Atypical Pneumonia Associated with 75
  C. A. McKinlay, E. H. Lange, and J. J. Boehrer
Endocrine Factors in Menstruation and Its Relation to Dysmenorrhea, The 428
  Nora Winther
Endocrine Therapy, Pediatric Aspects of 180
  Mildred R. Ziegler, and Arild E. Hansen
Endometrium, Irregular Shedding of the 434
  J. L. McKelvey, L. T. Samuels
Eosinophilic Leukemia 252
  R. O. Goehl
Esophagus, Benign Stricture of the 304
  E. M. Larson, John A. Layne, and L. L. Howard

F

Foreign Correspondence 62
  P. H. Millard
  (Reprinted from Northwestern Lancet, January, 1882)
Fractures:
  Emergency Treatment of 406
    Stanley R. Maxeiner
  Of the Malar-Zygomatic Compound 267
    Samuel G. Balkin
  Of the Mandible 228
    Carl W. Waldron
  Remarks on the Treatment of 88
    Don King

G

Gastroscopic Observations in Duodenal Ulcer 394
  J. B. Carey, and R. S. Ylvisaker
Glandular Tuberculosis 55
  C. H. Mayo
  (Reprinted from Northwestern Lancet, August, 1890)
Glaucoma, Advances in the Medical Treatment of 79
  Kenneth C. Swan
Gloves, Rubber, in Surgery 34
  G. G. Eitel
  (Reprinted from Northwestern Lancet, January, 1900)
Gynecology and Obstetrics in 1941 273
  Rae T. LaVake

H

Hay Fever, Recent Observations on, in Children 174
  Albert V. Stoesser
Health, Public, a Consideration of the Clinical and, Aspects of Trichinosis 389
  Willard H. Wright
Hearing, of College Students, Should be Tested? 312
  Edmund Prince Fowler, Jr.
Heart Disease, Valvular 218
  Paul Rowe
Hematoma, Bilateral Subdural, in an Infant 214
  Edward L. Strem, and Alex Blumstein
Hemolytic Jaundice, Congenital, with Hemolytic Crises in Children 188
  Emanuel S. Lippman
Hepatic Carcinoma, Primary, in Infancy 191
  Ralph V. Platou, and Alan J. Hill
Hernia, Successful Operation for Large Ventral 39
  William Worrell Mayo and W. J. Mayo
  (Reprinted from Northwestern Lancet, April, 1888)
Hormones:
  Carcinoma and, of the Prostrate 452
  Evaluation of the Clinical Use of Male Sex —— An 449
    Charles E. Rea
  Important Advances in the Physiology of the Sex 419
    Leo T. Samuels
  Methods of Measurement of the Naturally Occurring Sex —— 423
    Clara M. Szego
  Relation of the —— to Lactation, The 442
    W. E. Petersen
  Relation of Sex —— to the Climacterium 437
    Della G. Drips
Hormones, Sex, Common Use of the Female 18
  Justin L. Conrad
Hypoglycemic Shock in an Infant Born of a Diabetic Mother 348
  E. S. Platou

I

Indian's, American, Contribution, Food and Drugs, The 12
  H. A. Burns
Industrial Front, The 111
  Kendall Emerson
Infancy, Primary Hepatic Carcinoma in 191
  Ralph V. Platou, and Alan J. Hill
Infant, Bilateral Subdural Hematoma in an 214
  Edward L. Strem, and Alex Blumstein
Infants, Food for 59
  Hiram Corson
  (Reprinted from Northwestern Medical and Surgical Journal, November, 1870)
Influenzal Meningitis 168
  A. Hill, and E. S. Platou
Internal Medicine in 1941 275
  Thomas A. Peppard

Intersexual Manifestations of Nonendocrine Origin 446
Max H. Hoffman

Intestinal Parasite Problem, Is There an, in College Students? 260
Ernest Carroll Faust

Introduction to Symposium on Tuberculosis Control 376
J. A. Myers

J

Jackson, Clarence Martin—A Great Physician 142
J. A. Myers

K

Kentucky, Testing for Tuberculosis in 379
L. E. Smith

Knee Joint, Traumatic Affections of the 90
Edward Parnall

L

Lactation, the Relation of the Hormones to 442
W. E. Petersen

Law, Medical 62
(Reprinted from Northwestern Lancet, March, 1887)

Leukemia, Eosinophilic 252
R. O. Goehl

Lung, Infected Cysts of the 195
Leo G. Rigler

M

Malar-Zygomatic Compound, Fractures of the 267
Samuel G. Balkin

Mandible, Fractures of the 228
Carl W. Waldron

Mantoux Program in Rural Minnesota, Summary of a Ten-Year 384
L. S. Jordan

Medicine, Reflections on, in Review 33
S. Marx White

Megacolon, Medical Management of 184
Robert H. Alway

Meningitis:
  Influenzal 168
  A. Hill, and E. S. Platou
  Influenzal, Sulfanilamide in 94
  Milton Levine, and C. G. Polan

Menstruation, the Endocrine Factors in, and Its Relation to Dysmenorrhea 428
Nora Winther

Middle Turbinate, the Relation of the, to Paranasal Sinusitis 99
Frank L. Bryant

Military Radiology, Changes in, Since the First World War 273
R. G. Allison

Minneapolis Academy of Medicine, Transactions of the 24, 68, 273, 348

Minnesota, Rural, Summary of a Ten-Year Mantoux Program in 384
L. S. Jordan

Minnesota State Board of Medical Examiners:
  List of Physicians Licensed Nov. 13, 1941 30
  List of Physicians Licensed Feb. 13, 1942 245
  List of Physicians Licensed July 10, 1942 353

Montana State Medical Association:
  Alphabetical Roster 369
  District Society Roster 367
  Members of the Montana State Medical Association in Armed Forces and Public Health Service of the United States 371
  Presidential Address 362
  Sixty-fourth Annual Session, Transactions of the 355
  Woman's Auxiliary 371

N

Negroes of College Age, The Incidence of Tuberculosis in 400
Howard M. Payne

Newborn, Prothrombin Deficiency in the, as Affected by Vitamin K and by Prelacteal Feeding 155
L. F. Richdorf, and William Kearney

North Dakota Medical Society, Address of the 3rd Annual Meeting of, May 22, 1889 37
J. D. Millspaugh
(Reprinted from Northwestern Lancet, July, 1889)

North Dakota State Medical Association:
  Alphabetical Roster 338
  District Society Roster, 1942 336
  Fifty-fifth Annual Session, Transactions of 317
  Presidential Address 334
  F. W. Fergusson

North Dakota Workmen's Compensation Bureau, What the, Expects of the Physician 85
W. H. Bodenstab

O

Obstetrics and Gynecology in 1941 273
Rae T. LaVake

Ocular, Staphylococcic, Inflammation 207
James H. Allen

Ovarian Patients, After Treatment of 35
A. J. Stone
(Reprinted from Northwest Medical and Surgical Journal, September, 1870)

Ovarian Pregnancy with Endometriosis in the Same Ovary 276
Charles H. McKenzie

P

Paranasal Sinusitis, the Relation of the Middle Turbinate to 99
Frank L. Bryant

Pediatric Aspects of Endocrine Therapy 180
Mildred R. Ziegler, and Arild E. Hansen

Pericarditis, Chronic Constrictive, Impaired Ability to Fabricate Serum Proteins the Chief Cause of Edema in 199
Irvine McQuarrie

Physical Therapy in the College Health Service 264
Richard Kovacs

Physician, What the North Dakota Workmen's Compensation Bureau Expects of the 85
W. H. Bodenstab

Physiology of the Sex Hormones, Important Advances in the 419
Leo T. Samuels

Plasma, Stored, Use of Sulfathiazole to Eliminate Bacterial Contamination in 247
Milan Novak

Pleurisy with Effusion as a Manifestation of Rheumatic Fever 158
Arild E. Hansen

Pneumonia, Atypical, Associated with Rheumatic Endocarditis 75
C. A. McKinlay, E. H. Lange, and J. J. Boehrer

Poliomyelitis, Anterior, The Treatment of 411
John D. B. Galloway

Practice, Two Cases in 43
W. J. Mayo
(Reprinted from Northwestern Lancet, November, 1886)

Pregnancy:
  Ovarian, with Endometriosis in the Same Ovary 276
  Charles H. McKenzie
  The Remote Effects of Hypertensive Toxemias of 350
  John Amberg Haugen

Prostate, Hormones and Carcinoma of the 452
C. D. Creevy

Proteins, Serum, Impaired Ability to Fabricate, the Chief Cause of Edema in Chronic Constrictive Pericarditis 199
Irvine McQuarrie

Prothrombin Deficiency in the Newborn as Affected by Vitamin K and by Prelacteal Feeding 155
L. F. Richdorf, and William Kearney

Pulmonary Fibrosis, Unusual Cases of, Probably of Allergic Origin 68
R. S. Ylvisaker

R

Radiology, Military, Changes in, Since the First World War 273
R. G. Allison

Rheumatic Fever, Pleurisy with Effusion as a Manifestation of 158
Arild E. Hansen

S

Scoliosis, Treatment of 69
Myron O. Henry

Selective Service System and the Practice of Medicine, The 15
Robert A. Bier

South Dakota State Medical Association:
- Address of the President 294
  B. M. Hart
- Address of the President-Elect 296
  N. J. Nessa
- Alphabetical Roster 299
- District Society Roster, 1942 297
- Sixty-first Annual Session, Transactions of the 281
- Woman's Auxiliary 301

Staphylococcic Ocular Inflammation 207
James H. Allen

Staphylococcus Septicemia 68
Jay C. Davis

Student Health Auxiliary, A 20
W. H. York

Students:
- College, Is There an Intestinal Parasite Problem in? 260
  Ernest Carroll Faust
- College, Should the Hearing of be Tested? 312
  Edmund Prince Fowler, Jr.
- College, Tuberculosis Control Among, Theoretical and Applied 7
  Charles E. Lyght
- Medical, The Control of Tuberculosis Among 115
  E. Richard Weinerman, and Frederick O. Coe
- The College Health Program and National Defense Optimum Health for All 96
  Colonel Leonard G. Rowntree

Sulfanilamide in Influenzal Meningitis 94
Milton Levine, and C. G. Polan

Sulfathiazole, Use of, to Eliminate Bacterial Contamination in Stored Plasma 247
Milan Novak

Sulfonamide, for Treatment of Burns, "Prefabricated Eschar" or Bandage, Containing 455
William G. Clark, Ernest A. Strakosch, and Logan L. Leven

Surgery, Antiseptic, at the New York Hospital 50
Edward C. Spencer
(Reprinted from Northwestern Lancet, November, 1884)

Swine Erysipelas and Erysipeloid 211
W. L. Boyd

Symposium on Tuberculosis Control 376

T

Thrombosis, Coronary 216
Julius O. Arnson

Trachea and Bronchi, Tuberculosis of the 138
Jose Antonio Perez

Traumatic Affections of the Knee Joint 90
Edward Parnall

Trichinosis, A Consideration of the Clinical and Public Health Aspects of 389
Willard H. Wright

Tuberculin:
- Test, the Significance of the 380
  L. L. Collins
- Testing Surveys, The Advantages of 134
  L. L. Collins
- Test, The Present Status of the 376
  Esmond R. Long

Tuberculosis:
- Committee, American Student Health Association, Eleventh Annual Report of the 125
- Control Among College Students, Theoretical and Applied 7
  Charles E. Lyght
- Control, Symposium on 376
- Control, The Man of the Future in 112
  A. A. Pleyte, and Harold Holand
- Cutaneous, Allergy and Resistance in 250
  Henry E. Michelson
- Education About, in the 'Teen Age Group 381
  Leo H. Mynes
- Glandular 55
  C. H. Mayo
  (Reprinted from Northwestern Lancet, August, 1890)
- In Kentucky, Testing for 379
  L. E. Smith
- Occurring in High Schools 121
  Kathleen B. Jordan
- Of the Trachea and Bronchi 138
  Jose Antonio Perez
- The Control of, Among Medical Students 115
  E. Richard Weinerman, and Frederick O. Coe
- The Incidence of, in Negroes of College Age 400
  Howard M. Payne

Tuberculous Lesions, Disappearance of 225
Arthur T. Laird

U

Ulcer, Duodenal, Gastroscopic Observations in 394
J. B. Carey, and R. S. Ylvisaker

Ureterocele 277
E. L. Meland

Urine, A Plea for More Frequent and More Careful Examination of the 52
S. M. Stocker
(Reprinted from Northwestern Lancet, May, 1887)

V

Vaginal Smears, the Clinical Use of 24
Claude J. Ehrenberg

Valvular Heart Disease 218
Paul Rowe

Vision Facts for Visual Reasons 240
Hedwig S. Kuhn

Vitamin D, Comparative Therapeutic Value and Toxicity of Various Types of 372
Chapman Reynolds

Vitamin E in Progressive Muscular Dystrophy 276
John F. Pohl

Vitamins, The 4
Edward H. Rynearson

W

War, Some Problems of the College Health Service in a Nation at 146
Ruth E. Boynton

War Injuries of the Chest 403
Frank I. Terrill

Warming and Ventilation in Dakota 44
S. A. Brown
(Reprinted from Northwestern Lancet, April, 1886)

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